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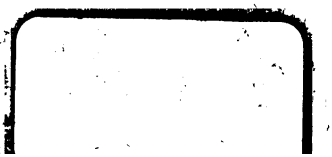

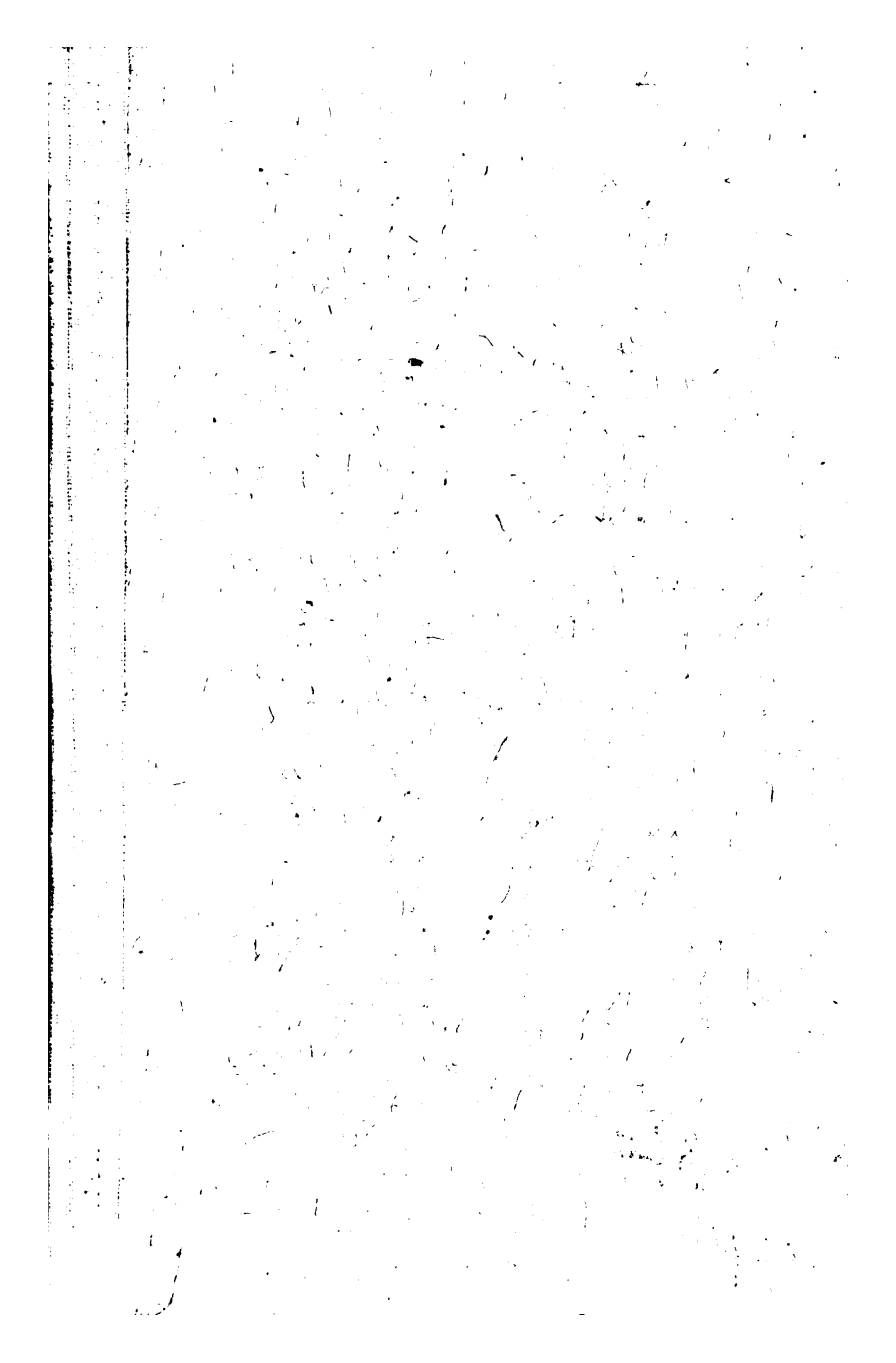

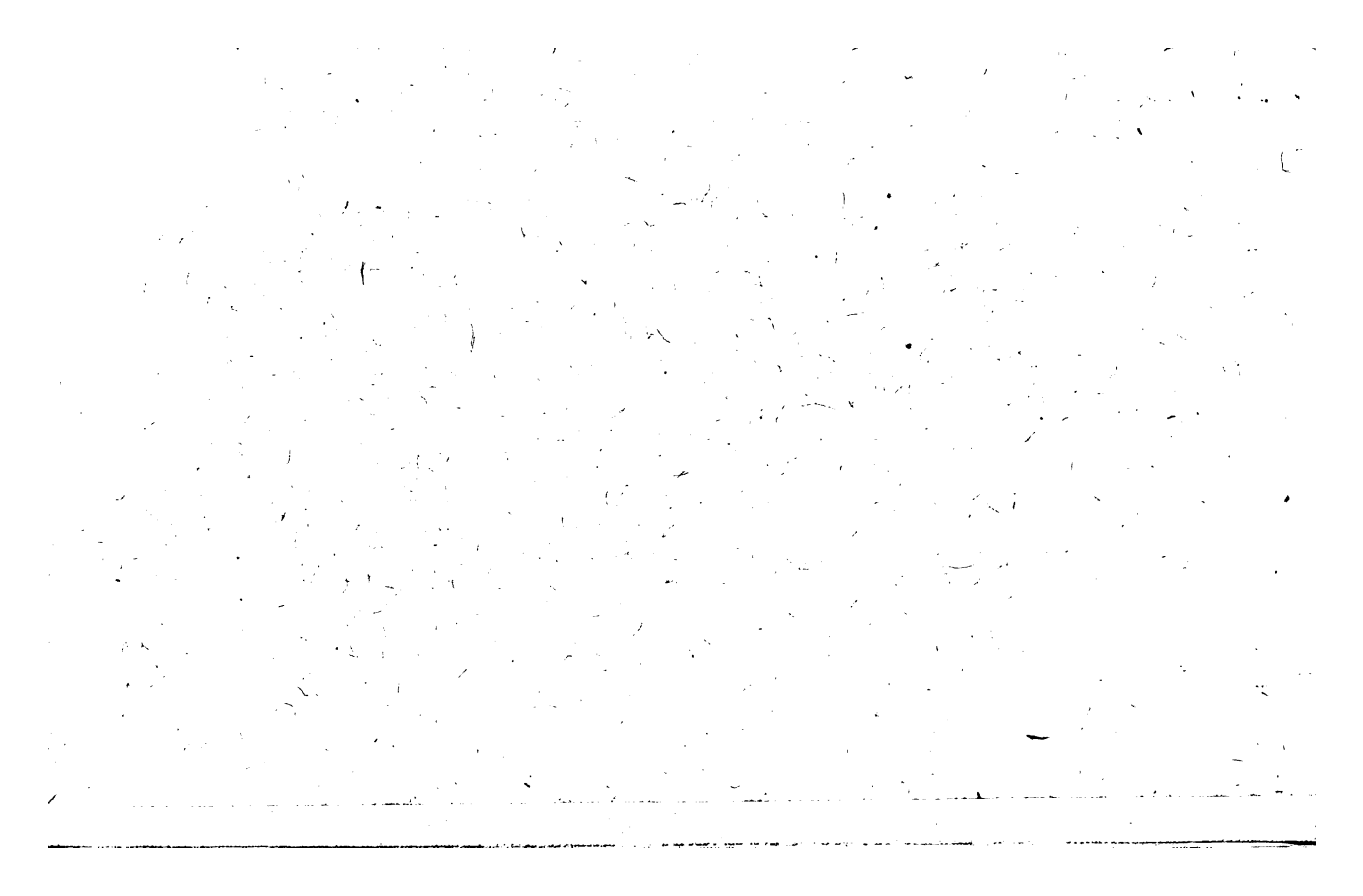

SWIMMING AND WATERMANSHIP

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TORONTO

SWIMMING AND WATERMANSHIP

BY

L. DE B. HANDLEY

Captain of the New York Athletic Club's
Olympic Swimming Team of 1904

Illustrated with Photographs

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THE MACMILLAN COMPANY
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INTRODUCTION

The art of watermanship has made tremendous strides in the past few years, but although Americans have contributed largely to the development, particularly in swimming, there is an almost total lack of up to date literature to fill the steadily increasing demand for accurate and specific information.

To meet the urgent need this book has been compiled, with the assistance of a number of America's leading experts, who courteously placed at the author's disposal their knowledge and experience.

The views expressed, therefore, do not reflect the ideas, and possible prejudices, of any one individual, but represent in every instance opinions shared by men having won fame in their especial fields, either as contestants in sport, instructors, or both.

A careful winnowing of the grain from the chaff has reduced the size of the book to handy dimensions, yet beginners will find within its pages every bit of information necessary to lead them from novicehood to proficiency, while skilled watermen, and even competent teachers, may cull from it helpful suggestions.

Among the champion watermen who offered val-

ued aid to the author were Messrs. Herbert Vollmer, Leo Goodwin, Tedford Cann, Joseph Wheatley, Arthur McAleenan, Jr., and Albert Downes, of the New York Athletic Club; Michael McDermott, Harry Hebner and Perry McGillivray, of the Illinois Athletic Club, of Chicago; Ludy Langer, of the Los Angeles Athletic Club; Norman Ross, of the Olympic Club, of San Francisco; Furman B. Willis, of Pennsylvania University; Charles Durborow, of Philadelphia; and George R. Hodgson, of the Montreal Amateur Athletic Association, of Canada. Among the former champions, now rated with the foremost instructors and coaches in the United States, were Messrs. James H. Reilly and Alex Meffert, of New York; Frank Sullivan, William Bachrach and Norman C. B. Cox, of Chicago; Thomas Whitaker, of St. Louis; and Matthew "Daddy" Mann, of Boston.

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SWIMMING AND WATERMANSHIP

SWIMMING AND WATERMANSHIP

THE VALUE OF SWIMMING IN PHYSICAL CULTURE

IT is universally recognized, nowadays, that swimming is an essential item in the education of every man and woman, because of its great value in self-protection and lifesaving.

It is also widely appreciated, in a general way, that swimming is a most beneficial form of all 'round exercise.

The majority, however, do not seem to realize the advantages to be derived from regular practice of the art of natation in summer, and more particularly during the winter months, when life in the open air is greatly curtailed and outdoor activities consequently restricted in scope.

Yet the large and steadily increasing number of private, public and municipal pools available for use throughout the United States, has placed facilities for constant bathing within reach of most people, even in those sections not favored with natural sea, lake or river resources, and made swimming a year 'round possibility.

Now frequent indulgence in swimming will not only lead to the gaining or retaining of good health, but improve and strengthen the entire system, developing the body thoroughly and symmetrically, activating and regulating its functions, and tending gradually to establish normal proportions.

There is, indeed, no better normalizer than swimming. It will reduce the over stout by eliminating the excess of fatty tissue; fill out the unduly lean by upbuilding all muscles.

Of course, nothing is accomplished without effort, and those who expect results from an occasional few minutes of idle paddling are doomed to disappointment. But any one sufficiently in earnest to work faithfully and often may count on success. And, after all, few will dispute the assertion that swimming and water sports furnish a far more attractive means of physical culture than uninteresting and tedious exercise taken at home or in the gymnasium.

The amount of work to be done will depend largely on the object in view, whether reducing, upbuilding or just keeping fit, and the strength, condition and ability of the individual.

It goes without saying that a stout person must do more to take off weight than need a lean one to acquire flesh and muscle, or a normal one to stay in good shape. It will also be clear that a weak candidate or one in poor condition, should not attempt to do so much as one in health and fit, and that an indifferent swimmer cannot undertake the same course as an expert, for the output

of energy increases proportionately to the lack of skill.

It is really imperative, in order to fully profit from regular swimming, that a correct stroke be mastered; otherwise so much effort is required that exhaustion comes before there has been the chance to practice long enough to be benefited. At first, therefore, it is advisable to swim only under the supervision of a competent instructor and pay strict attention to form.

In the early stages, too, both poor and good swimmers should proceed with utmost moderation, for when muscles and lungs are unaccustomed to exertion it is an easy matter to overdo things. By starting with short, slow stretches, stopping to rest at the first sign of fatigue, then by degrees trying more and more, all danger of overworking is avoided.

This system eventually makes it possible to daily cover middle distance courses in comfort and emerge from the water refreshened and invigorated. In the pool of one of the New York clubs there gather every afternoon a group of men in middle life, who go in for a brisk swim ranging from one quarter to half a mile, and each attributes to faithful adherence to the practice the vigorous and buoyant health they all enjoy. There might be mentioned also cases of men and women having cured by constant swimming nervous complaints, indigestion and other ills; of stout people having reduced from thirty to fifty pounds in one year; of abnormally thin ones having developed into well built, round muscled specimens.

Speed swimming is not to be recommended for the purpose of exercise and physical culture. It is the steady work done at moderate pace that yields the best results.

Water games and sports, however, are strongly advocated, for they provide pastime and variety, turning work into recreation. Nor does this imply participation in competition. Water polo, water basketball, pushball and other interesting games are often played for pleasure by men and women who never enter an open contest; fancy diving, plunging, and trick and fancy swimming will give exercise while making an agreeable change in the routine and also offer an added inducement to persevere.

ADVANTAGES OF THE MODERN STROKES

TO any one who has made a comparative study of old and modern methods of swimming the advantages of the latter are self-evident.

But the habit has so long prevailed among the uninformed to look upon all strokes as divided into two distinct groups, one embracing those suitable for general usage, the other made up of the so-called speed or racing strokes, that it is necessary to dispel this belief and point out why up to date styles should be universally adopted for all purposes.

There is actually no such thing as a purely racing stroke. Let it be noted that the various changes effected during the past half century in man's mode of propelling himself through the water were merely sequent and closely allied phases in the evolution of a simple stroke.

Thus, in passing successively from the breast to the side stroke, then in turn to the single overarm, double overarm, early trudgeon, Australian crawl, and the present crawl and trudgeon crawl, only small changes occurred, and for a time each and every one of the strokes now considered in the useful class was itself given rank as a racing medium.

It was natural that the competitor should be the pioneer of every innovation, for his interest in sport made him eager to thoroughly test any new idea which promised improvement. But the very success he eventually attained, far from proving the stroke confined to a small minority, demonstrated practically its value to all.

In fact, a new stroke, in order to bring success in all 'round competition to racing men, as a class, must enable them to so reduce the effort that they can develop greater speed and endurance than was possible with the former styles on the same output of energy. It would be illogical to believe, therefore, that methods which allow the contestant to travel faster and farther without increasing the strain, will not render equal service to the man or woman who swims for pleasure, exercise or necessity.

Now the modern strokes have enabled their devotees to cover the classic racing distances, from fifty yards to one mile, in times never dreamed of by exponents of the old styles; to defeat the latter consistently and conclusively in marathon swims all the way from three to twenty miles; to negotiate in fourteen to fifteen hours courses longer and more difficult than the one across the English Channel, the goal of the greatest endurance swimmers, which users of former methods took more than twenty-one hours to complete.

This remarkable increase of efficiency may only be explained in one way. Man's physical resources have certainly not improved to such an extent in the short space of fifty years. He has

simply discovered the means of applying to better advantage the natural forces at his disposal.

It may be added that the modern strokes are also the easiest to learn, because they are made up of movements closely resembling primitive man's natural mode of swimming, the dog paddle, which most children fall into by inclination when they first take, untaught, to the water. They are comfortable to use, for the position of the body relieves of all strain, and they can be mastered more rapidly. Everything favors their adoption.

LEARNING TO SWIM

RESULTS attained in teaching beginners to swim by means of the elementary crawl system have conclusively demonstrated its superiority over all other forms of preliminary instruction.

Indeed, while many of its present advocates took it up in a most skeptical frame of mind, some with the avowed purpose of proving its shortcomings, then condemning it, they soon became convinced of its remarkable efficiency and declared themselves fully converted.

I speak on this subject from first hand knowledge, because I was opposed to the new method at its introduction. But an early experiment undertaken with three groups of non-swimmers, started simultaneously on the breast stroke, side stroke and elementary crawl, left no room for doubt. Those placed at the crawl outdistanced the others individually and collectively. They not only acquired far more readily the rudiments of watermanship, but completely outclassed their rivals when it came to mastering the advanced strokes.

Before attempting to explain why the method insures such rapid development, it is necessary to describe it in detail, that the points to be made may be clearly understood.

It first deserves mention, though, that the ele-

mentary crawl is quite similar to the crawl proper in all but one important feature: The head is not submerged, as in the latter; it is held high, mouth above water, so that one is able to breathe freely and naturally.

The schooling of a novice is started with a demonstration of the arm action, on land. He is made to stand with one foot slightly in advance of the other, told to bend from the waist until his upper body is approximately on the swimming plane, then instructed to rotate the arms in imitation of a windmill, each beginning with hand at hip, moving back and up, swinging overhead, then sweeping forward and down to original position. The movements are continuous, alternate and equidistant. As one hand brushes the thigh the other should be passing above the head.

After a few moments of this drill the novice straps on at the waist a pair of water wings, or some such supporting device, then enters the water at a shallow spot and leans forward, retaining his footing. In this position he is asked to go through the same arm movements and made to realize that they entail a deep, straight drive and an above surface recovery.

This grasped, he stretches out for actual swimming and proceeds to work with arms only, keeping all muscles relaxed, rolling heavily from side to side, and allowing his legs to trail idly behind, fully extended, but limp.

It has been my experience that most beginners make good headway at the initial attempt. And it could hardly be otherwise, for the wings buoy

up comfortably, the alternate arm drives furnish constant propulsion, and there are absolutely no underwater movements of resistance to check progress.

Now for a non-swimmer to discover that he is able to advance at the first trial is for him to at once gain confidence, and confidence is everything in learning to swim, for anybody can imitate the swimming movements on land, and only lack of self-reliance, or fear, prevents one's doing so in the water.

As soon as a pupil has had a taste of swimming it is advisable to convince him of the buoyancy of the human body by giving him an exhibition of motionless floating, then taking off his water wings and making him also try it. Next he should be sent for a short spin in deep water, again supported, in order to realize it is just as easy to swim beyond one's depth as within it, and after a little more practice with the sole use of the arms he may be put at the leg drive.

If instructions have been followed closely, and the novice has sought a heavy roll, he will learn the wanted action without trouble. The rolling motion causes the legs to sway up and down automatically, each in time with the opposite arm, so that the foundation of a correct and rhythmic double kick has been unconsciously laid before any attempt is made to voluntarily use the legs. It is only necessary, therefore, to gradually emphasize the acquired movements in order to attain the prescribed drive. Then the elementary stroke is complete.

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THE ELEMENTARY CRAWL — Practising the stroke. 1. On land. 2. On water wings. 3. Unsupported.

At this stage the water wings may be discarded, but if the pupil experiences any difficulty without them it is advisable to allow him to go on using them, for he will then practice in greater comfort.

Once familiar with the elementary crawl, the developing swimmer must be taught to breathe so that he can assume the face down position required by the advanced types of stroke, and this entails inhaling through the mouth and exhaling underwater through the nostrils. Then his arm action is rounded off and his leg drive adapted to whatever style he wishes to adopt. These points, however, do not come under the heading of preliminary instruction and will be covered in future chapters.

Touching, however, upon the merits of the elementary crawl, as compared with the breast stroke, still rather widely favored for teaching beginners, it may be submitted: first, that the former does away with the long, complicated land drill indispensable in the latter; second, that the leg drive is acquired virtually without study in the crawl; third, that with the crawl no time has to be devoted to synchronizing arm and leg movements; while in the breast stroke a great deal of practice is needed to coördinate the action; fourth, that the crawl completely eliminates those negative movements of resistance which stop the breast swimmer at every stroke and cause him to waste half the applied power; fifth, that the alternate arm action of the crawl not only furnishes continuous propulsion, but keeps the mouth always above water, while the breast stroke allows stop-

page and sinking between drives, thereby forcing intermittent breathing; sixth, that the changes in passing to the advanced strokes from the crawl are quite immaterial, and that everything learned must be unlearned in making the shift from the breast stroke.

These advantages have had practical demonstration. It has been proved that a beginner can be taught the elements of watermanship with the crawl in half the number of lessons required with the breast stroke and that the difference is even greater in the race toward proficiency.

The elementary crawl is especially valuable in class instruction, because of its simplicity, and it has given particularly good results in teaching girls and women. It is also the best for self-instruction.

In concluding, two things need be impressed on the would-be swimmer: first, that it is essential to keep all muscles relaxed, for tension causes undue fatigue and spoils form; second, that nothing is gained by haste, both because rapid movements lead to prompt exhaustion, and because they make impossible correct execution of the stroke.

THE CRAWL

SO many varieties of crawl stroke have been evolved that it is necessary to make clear that the style known in this country under the name is a double over arm stroke in which legs perform a narrow, alternate, continuous thrash of even scope.

This explanation is essential, because the trudgeon-crawl is so similar in appearance that the two types are often confused.

Broadly speaking, in fact, no class distinction can be made between these strokes, for both are built on identical fundamental movements. The arm action is the same and the leg drive in each is composed of several more or less wide scissor kicks executed by whipping the legs back and forth with knees almost straight and feet pointed.

As, however, the difference in width and direction of the crawl leg thrash bears considerable influence on the mechanical and anatomical principles involved, and the art of swimming has developed to the point where every detail must be considered of importance, it will be advisable, at least here, to look upon the crawl and trudgeon-crawl as separate strokes.

In swimming the crawl the body should be held as in standing upright on tiptoe, so that it forms a straight line, with head erect, back the least bit

arched, legs together, feet pointed. Resting on the water there should be a gentle downward slant from head to feet. In sprinting, when the speed attained makes it possible to hydroplane more effectively, the slant should be more pronounced, but it must be lessened gradually as the pace is decreased to cover lengthening courses. A slight side to side roll is sought to facilitate inhaling and to permit a clean recovery of the arms, but it should not be heavy. Excessive bending at neck, waist, knees or ankles should be avoided.

The arms work alternately, one propelling while the other recovers, and they execute virtually the same cycle of movements, though the under one (opposite the breathing side) dips a little deeper, due to the heavier roll of the body toward it.

Each arm enters the water with elbow slightly raised, forearm and hand aligned, palm down, fingers and thumb close together. The hand cuts the surface just before attaining full reach beyond the head, and dips to its own side of an imaginary line drawn between the eyes and through the middle of the body. Then it presses forward under water, so that by the time the arm comes to comfortable full extension it is slanted a trifle downward, at the wanted angle to make the power effective as soon as applied, thus avoiding the loss of motion and force experienced if the arm is completely extended above water.

After catching smartly the arm sweeps down the back, following a course parallel to the center line of progression and maintaining strong pressure on the water until the hand nears the thigh.

Here the muscles are relaxed, the elbow is lifted, and the arm drawn up and out. As the hand emerges from the water it is bent back from the wrist, palm up, to better clear the surface, then moved out and forward, simultaneously turning palm down, so that by the time it passes the shoulder line the whole arm is in the prescribed position for another entry.

The legs should be held straight, but not rigid. They whip back and forth alternately, closely imitating the movements one makes in walking on tiptoe with mincing steps. The power is obtained from hips, knees and ankles, but it is advisable in practicing to try to draw it chiefly from the hips, for otherwise there will be a strong tendency to bend abnormally at knees and ankles, increasing the resistance.

The width of the thrash should not exceed fourteen inches between heels. A greater opening will cause the feet to rise above surface on the upward stroke and energy is then wasted. The most successful racing exponents of the crawl display a very narrow thrash, seldom more than eight or ten inches in scope.

The speed of the drive should be adjusted to individual requirements. A swimmer with supple, agile legs, will naturally be able to use effectively a faster action than one with heavy, slow moving limbs. Any even number of movements per complete stroke of the two arms will afford correct rhythm, and from two to eight have been tried. The great majority of swimmers, however, appear to find four or six most advantageous. In nata-

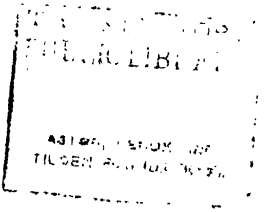
torial parlance each downward leg movement is called a beat, and the terms four-beat crawl, six-beat trudgeon-crawl, etc., indicate how many kicks are made to every double arm stroke.

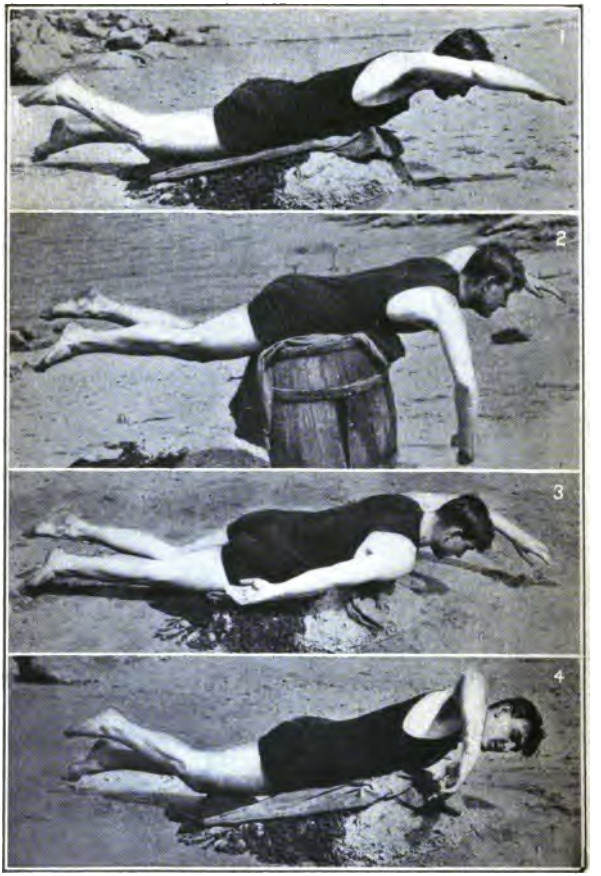
The proper coördination of arm and leg movements is essential to good swimming. The various parts of the human muscular system are so inseparably correlated that it is impossible without it to fully exploit one's physical resources. And there is need of laying stress on this fact, for the belief seems rather prevalent that in the crawl the arms and legs may work independently. In reality form, speed and endurance can only be gained by accurate inter-timing of all movements.

Whatever number of leg drives made per stroke, the wanted rhythm is attained by performing one of the beats of each leg at the end of the pull of the opposite arm. That establishes perfect coördination.

Those who find it difficult to combine the movements should practice for a while with only one kick, taken at the finish of the top arm pull with under leg thrust back. When they have learned to place it correctly the rest of the thrash will adjust itself almost automatically.

It is one of the basic principles of swimming that all positive movements of propulsion must be made vigorously and all negative ones of resistance slowly, with muscles relaxed. In applying this principle to the crawl leg thrash it must be considered that each simultaneous upward movement of one leg and downward of the other goes to the forming of a complete scissor kick, drive and





1. Top arm at catch. 2. In mid-drive. 3. At finish. 4. In recovery.

recovery included. In fact, during the first part of the double act, while the legs are closing, the swimmer is propelled forward, but after the legs pass and proceed to open in the opposite direction they are actually in recovery. It is necessary, therefore, to put snap and energy in the closing movement, then allow the legs to float gently apart, relax, in opening them.

This matter of differentiating between positive and negative movements is not easy, because the rapid action of the crawl thrash hardly affords the time to make the close distinction. But if the swimmer will practice at very slow pace he will find it possible to acquire the relative spacing and later retain it, proportionately, even when traveling at high speed.

Correct breathing is imperative in swimming the modern strokes. Not only do position, balance and rhythm depend largely upon it, but also ability to cover any distance, for proper oxygenation of the lungs is indispensable in all forms of continued physical effort. Let it be remembered that the face is submerged part of the time and that the usual method of breathing cannot be used.

One must inhale by mouth while the body rolls over during the last part of the pull of the top arm and the first part of its recovery, then exhale through the nostrils, under water, during the rest of the stroke. The air should be drawn in with a deep, swift inspiration, so as to completely fill the lungs, then expelled gradually.

The head is twisted toward the upper shoulder to facilitate the intake, but the swimmer should

make sure it is a twist only, for if the head is raised the feet will unavoidably sink and break the balance of the body. Also, the head should not be carried constantly twisted toward the breathing side, as so many do, but allowed to sway back with the roll of the body, or difficulty will be experienced in clearing the water during the recovery of the under arm.

To learn swimming respiration the beginner should stand in shallow water, take a good breath, then duck the face and let the air ooze out by degrees through the nostrils; or he may follow the same process in a basin or tub at home. Once familiar with this mode of breathing it is excellent practice to push off from the side of a pool in prone floating position, arms extended in front, on the surface, face down, then roll over, inhale, roll back, exhale. Later, the same is done with arms in action and the task is completed.

The lungs should be filled and emptied at every stroke while swimming. Some contestants are in the habit of breathing less frequently in sprinting, but it may be questioned if they gain by it. On the other hand, there is absolutely no doubt that intermittent breathing militates against progress while learning to swim. The demand for air becomes so strong that the pupil is invariably led to hasten the movements, which is harmful, and to lift the head in gasping for breath, thereby acquiring a fault hard to eradicate later.

Minor details of all strokes can only be worked out by the swimmer himself or his instructor, for here personal characteristics are the determining

factor. The slant of body to be sought, for instance, and the amount of rolling to be done, will depend a good deal on individual buoyancy. Some people float higher than others and they are naturally better able to plane, and also to effect a clean recovery of the arms with hardly any roll. Again, swimmers with limber muscles and joints can take advantage of a longer reach and a straighter arm drive than those less supple, profiting thereby.

THE TRUDGEON-CRAWL

THIS stroke derives its name from the leg drive, which is a combination of the rather wide scissor kick of the trudgeon and the narrower thrash of the crawl.

It is essentially an American stroke, evolved by Frank Sullivan, a prominent Chicago instructor, then developed and brought into prominence by American swimmers.

In its original form the leg drive was made up of one wide scissor, taken at the end of the top arm pull, and one, three, or five smaller ones; but later a second major scissor was introduced at the finish of the under arm pull and two distinct varieties were created, respectively termed the single and double trudgeon-crawl. As previously mentioned, the arm action is the same in all the modern free style strokes.

At the time Sullivan conceived the idea of combining the trudgeon and crawl it was the universal belief that the latter was too punishing to be used for distances greater than one hundred yards and that the trudgeon would indefinitely prove its superiority over longer courses.

Sullivan, however, realized that by reducing the crawl thrash to a mere fluttering motion of the feet it could be made almost effortless, and that added to the trudgeon, betweeen scissor kicks, it

would serve to maintain the acquired momentum and prevent leg drag, without sensibly increasing the expenditure of power.

He also reasoned that since the crawl thrash was nothing but a series of narrow scissor kicks it might be possible to give it greater efficiency by widening one of the beats and narrowing the others, on the theory that once an object has been set in motion it requires much less than the starting force to keep it moving at the speed attained.

Being a practical man, Sullivan proceeded at once to submit his theories to the test and he taught the new stroke to four young novices. One of them dropped out of swimming before reaching maturity; the other three — Harry Hebner, Perry McGillivray and Richard Frizell — developed into champions, and their brilliant success was chiefly responsible for the adoption of the trudgeon-crawl throughout the United States.

Expert opinion is not unanimous as to the relative merits of the crawl and single and double trudgeon-crawl, and this is hardly to be wondered at, for the available data are insufficient to pronounce with assurance on the subject. It is possible, too, that future events will confirm the view of some of the leading authorities of the day, that the difference between the three strokes, slight at most, is due more to their being suited to different types of swimmers, than to anything else.

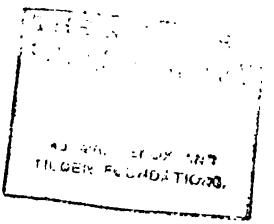
The trudgeon-crawl, like the crawl, is adaptable to slow or swift leg action, but so far none has attempted more than a six-beat thrash.

The single variety, so-called because the one

major scissor gives it a strong mono-rhythm, calls for a rather pronounced roll during the top arm pull, because said major kick is given an opening of from twelve to twenty inches, and unless its direction is slanted the under leg will rise above water and the foot will find no leverage in starting its drive. The minor kicks which follow are performed almost at right angles to the surface, while the body is face down, and should have an approximate scope of six to eight inches.

Some swimmers, in using the trudgeon-crawl for sprinting, will reduce the major kick until it hardly outspans the rest of the thrash, merely appearing, then, as an emphatic marking of the rhythm, and they will gradually widen it, at the same time narrowing the minor scissors, as the distance to be covered increases. Others make no change whatsoever, but the former plan is the better, for it enables one to adjust the drive to personal requirements and utilize more adequately the leg power.

In the double trudgeon-crawl a side to side roll is necessary to give the two major kicks the wanted slant to keep the feet submerged, but it need not be as marked in the single variety, for these kicks should not exceed fifteen inches in width. Irrespective of the number of minor scissors introduced, the two major scissors are performed one at the end of each arm pull, but with the legs alternating in position. To illustrate. Given a swimmer breathing on the right side, so that the right arm is the upper: the first kick is executed at the end of the right arm drive and it is the left leg


TILDEN FOUNDATIONS

THE SINGLE TRUDGEON-CRAWL — 1. Catch of top arm. 2. Top arm in mid drive. 3. Top arm at finish.

(the under) which opens backward, and the left forward, in preparing to propel; but the body then rolls over and the legs change position, the right becoming the under and the left the upper, so in the second major kick, at the finish of the left arm pull, it is the right leg which opens backward and the left forward.

The foregoing fully describes the two-beat drive, but in the four-beat drive the alternate action does not place the legs in the needed position for the major kicks, as will readily be seen by trying it, and the swimmer must cut the minor scissors in half to secure smooth rhythm. The feet are stopped in these minor scissors after the whip together, as they meet, then the legs are completely relaxed and the rolling motion of the body will cause them to automatically drift out and dispose themselves properly for the major kick.

The six-beat drive is obtained by merely completing the minor scissors of the four-beat, for this makes it necessary to perform one more beat in order to place the legs correctly for the next major scissor, thereby introducing three kicks to the pull of each arm, or six to the complete stroke of the two arms.

In learning the leg drive of the six-beat double trudgeon-crawl it is very helpful to count the scissoring motions as they are executed and emphasize the count on the major ones. If the swimmer will start with under arm at full reach, top arm down at the side and legs open and ready to snap together, counting "one" as he gets under way, the major kicks will occur on "one" and

"four." The action should so be timed, therefore, that ONE-two-three will be counted during the pull of the under arm and FOUR-five-six on the pull of the top arm, laying stress on both movement and count at "one" and "four."

All three varieties of this type of stroke, two-, four- and six-beat, are marked by a dual rhythm, set by the two major kicks. Hence the name.

It is claimed for the double trudgeon-crawl that it is superior to the crawl because the leg power is applied more effectively and because the action can be adjusted to individual needs; quite a few also consider it superior to the single trudgeon-crawl, because it establishes a more perfect balance of applied power and driving impulse, since both legs perform virtually identical movements.

Theoretically these claims seem warranted, but so many factors enter the consideration where the science of swimming is concerned that the most carefully evolved theories often fail to work out as expected when put to the practical test. This type of stroke is gaining steadily in popularity among contestants of both sexes, however, so cumulative results may clear the point at issue before long.

THE TRUDGEON

THE trudgeon stroke now in use bears very little resemblance to the one originally given the name. The latter was featured by a short, choppy arm drive, and an exceedingly wide kick, in which both legs were bent and raised at the knees. The modern type is a combination of the long, straight, alternate arm action seen in all up to date free style strokes, and one comparatively narrow scissor kick, taken at the end of the top arm pull with legs straight and feet pointed.

This kick is usually given an opening of twelve to fourteeen inches for sprinting, and gradually widened for middle and long distance swimming, but it should never exceed twenty-four inches. The average person, in fact, will find an opening of twenty inches the most satisfactory limit.

It is especially important to make the recovery movements of the trudgeon kick very slowly, because in moving the legs apart to the prescribed width considerable resistance is offered to the water, and the quicker the action, the greater will be the check experienced.

In learning the trudgeon the beginner may follow instructions given in the preceding chapter on the crawl, for the stroke is no more than a plain crawl, with the leg thrash reduced to just

one of its scissoring units. In all but this, therefore, the same rules apply.

Those having served their swimming novitiate at the elementary crawl will find the trudgeon easy to master. It is for them merely a case of learning to breathe, then eliminating the second of the two kicks acquired during the preliminary schooling.

The trudgeon is a good, comfortable stroke to adopt for pleasure and long distance swimming. The pause between kicks allows the legs to rest after each propelling movement and makes the action virtually effortless, as clearly shown by the fact that little girls of ten and twelve have held the stroke continuously for ten and more miles, while men have maintained it without interruption for fifteen to twenty hours.

Many of America's leading exponents of aquatic endurance have used the trudgeon in their greatest record breaking feats.

PREVALENT FAULTS TO AVOID IN THE FREE-STYLE SWIMMING STROKES

PERFECT form in swimming is rarely seen. Even the world's greatest devotees of natation usually display slight defects of style, while the stroke of the average man or woman is invariably found to show several more or less pronounced faults of execution when carefully analyzed.

This is due both to the number of factors which must be considered in practicing, making concentration on any one most difficult, and to the fact that the swimmer cannot see himself, or herself, in action, so that bad habits are often acquired unconsciously.

It is all important, therefore, to be constantly on the lookout for faults and to swim as frequently as possible under the supervision of a competent instructor.

In the chapters on the various free-style strokes — trudgeon, crawl and trudgeon-crawl — the movements to perform have been fully described, but as the prevalent faults incurred are the same in all it was deemed advisable to cover them collectively and avoid repetitions.

Taking first the arm action, the errors chiefly to be guarded against are: reaching out too far or too high; cutting the stroke; lowering the shoulders before or during the catch; overlapping

or opening wide at the entry; sweeping in or out in driving; bending the arms while propelling; keeping the wrists unbent as they leave the water; recovering with rigid arms; rushing the recovery; striking the surface or raising the arms too high on the recovery.

An excessively long reach only places unnecessary strain on the muscles without offering adequate compensation, and a high reach entails loss of motion and energy, because the applied power does not become effective until the arm assumes a downward slant. Best results are attained by making the extension full, but comfortable, and giving the arm the wanted downward slant before it is completely stretched out.

Lowering the shoulder previous to or at the catch causes waste of strength and increased resistance. If the body rolls over before the hand has anchored itself on the water the arm is left pointing upward and the first part of the drive does not propel forward, the angle of pressure tending rather to check the advance. The correct way is to enter with shoulder well raised, apply power, then roll gently, but aiming always at making the shoulder keep up, not plunge and sink after the arm.

Three things usually are responsible for shoulder-dropping: turning the head too soon from the recovering arm, overreaching, or diving after the entering arm, instead of trying to lift the body by downward pressure.

Overlapping at the entry and catching too

wide both mean deviation from the true course and stoppage, for the resulting drive is bound to be more or less lateral, instead of straight, as it should to propel directly ahead. The entry must be made so that the hand will dip at the point on its own side of the center line of progression, which will bring it just outside the thigh after a straight down and back sweep, parallel to said center line of progression.

A swimmer can tell pretty accurately whether the pull is direct by noticing the position of the hand at the end of the drive. It should be flat, palm up. If the palm is turned to or from the body it is conclusive proof that the pull was not altogether straight.

The arms should be well outstretched in propelling, but without strain. In fact, a trifling bend at the elbow will do no harm if natural, and provided the whole arm retains its pressure on the water. But many swimmers break so badly in mid-drive that the forearm is left pointing forward, following the elbow, and the hand then obviously loses all purchase on the water.

Whipping out at the finish is unprofitable. Power is simply thrown away by it. The final act of the arm drive should be one of relaxation.

Holding the wrist straight as the arm leaves the water causes difficulty in clearing the surface and tends to stiffen the muscles during the recovery, when they should be limp. As soon as the hand emerges it should be curved back, palm up, then gradually straightened and turned palm

down as it moves forward. This ensures a clean recovery without the strain of raising the elbow very high.

Recovering with arm outstretched is awkward, tires the muscles, prevents relaxation and causes the head and shoulders to sway to the opposite side. The elbow should be thrust out and bent at the finish of the drive, then the forearm circles around and leads it during most of the forward movement.

A fast recovery is contrary to the very principles of swimming, which prescribe that all negative movements shall be performed slowly, in relaxation, and it squanders energy. If the arm is rushed forward a pause occurs at the catch or during the drive and the power used in the swing weakens by just that much the vigor of the following pull.

Coming next to the legs, the commonest faults are: bending at hips, knees and ankles; failing to move the under leg back sufficiently; and incorrect timing.

Whether one uses the single, comparatively wide scissor kick of the trudgeon, or the narrower scissoring motions of the crawl and trudgeon-crawl, the legs should whip straight from the hips, with knees unbent and feet pointed.

This does not mean, though, that the action should be stiff. On the contrary, free play of the muscles is essential. But the tendency is general to draw up the knees, raise the toes, and work only the lower legs, thereby losing propulsion and increasing resistance. So the developing swim-

mer will often profit more by holding the legs rather rigid, at first, than by practicing incorrect movements and acquiring faulty style. Once the wanted action has been mastered the legs will relax naturally, little by little, giving both knees and ankles slight play. But it will be the play of supple muscles, as it should, not the bend of misplaced effort.

Failure to move the under leg back sufficiently from the hip gives the whole body a bad position, destroys the balance and causes constant drag. It is this failure which usually accounts for folding at the waist, so that the legs sink deep when the swimmer is face down. It also deflects the angle of propulsion, for when the legs are open they do not converge toward the line of advance, but off to one side. The power is applied at a tangent, therefore, and partly wasted.

The swimmer may ascertain just where both legs should be, when open for the drive, irrespective of its width, by standing erect on land, one foot forward, the other back. An imaginary line drawn through the center of the body to the floor should divide evenly in two the angle formed by the legs.

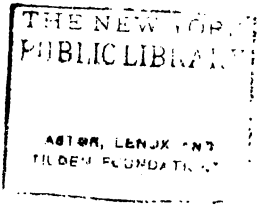
Accurate inter-timing of arm and leg action is indispensable to rhythmic swimming and the easiest way for the beginner to synchronize the movements is to concentrate on the principal rhythm-setting kick, at the end of the top arm pull. If this kick is properly placed the rest of the leg drive will adjust itself automatically with practice. It is a good plan, when the timing is wrong, to al-

ways start swimming with the under arm at full reach, the top arm down at the side and the legs open, under one back, upper one forward, then snap the legs together as the under arm begins its drive.

Incorrect use of the head is responsible for a good deal of poor form in swimming. Every time it is raised or lowered, bent to one side or the other, a fault is incurred. Raising it causes the feet to sink and drag; lowering it increases the resistance and makes difficult clean recovery of the arms; bending it toward either shoulder may lead to overlapping at the catch, deviation, awkward recovery and other errors.

The head should be held erect and on the same plane always, merely twisting, like a weather vane, to facilitate breathing. It should twist toward the upper shoulder only while the swimmer is inhaling, then twist back to natural position, or even a trifle toward the under shoulder. It is a mistake to carry it turned constantly to the breathing side, as many do, for it prevents a neat recovery of the under arm.

It deserves mention in concluding that swimmers endeavoring to correct a fault should exaggerate in the other direction. Once the muscles have become accustomed to a given action the slightest departure from it has the feeling of being excessive, so that unless exaggeration is resorted to the fault is not completely eradicated and will usually return as soon as vigilance relaxes.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PRACTICING THE MOVEMENTS OF THE BREAST STROKE ON LAND.— 1. Shows starting and finishing position.

THE BREAST STROKE

ALTHOUGH the breast stroke cannot be recommended to beginners, there are good reasons for taking it up after one has mastered an up to date free-style stroke. It is valuable in lifesaving; it is featured in national and Olympic aquatic competition; and it is often pleasant to use, for it enables one to breathe naturally and see what is going on all around.

The breast stroke now adopted by the leading swimmers is not the type still generally taught in this country. The arms are no longer swept back close to the surface until at right angles to the body; they take a shorter drive and pull down as well as out; also, the arms and legs do not drive and recover together, but alternately.

The superiority of the new arm action over the old is established by increased facility in breathing, less waste of energy, and reduced negative movements of resistance.

The lateral pull of the arms formerly advocated raised the shoulders very little, and only at the beginning of the drive, making breathing difficult; while the new outward and downward sweep lifts the upper body higher and longer, giving a better opportunity to inhale freely and deeply.

The shortened length of the drive materially reduces the inward and forward movements of re-

covery, minimizing the resistance, and the gain thus obtained completely outweighs the slight advantage formerly secured from the longer, near surface pull.

As to the benefit derived from the alternate action of arms and legs, it consists in more even distribution of the effort, constant propulsion, and lessened stoppage between strokes.

In using the modern style the arms are comfortably extended at the start, hands on the surface, palms down, fingers close, thumbs almost touching. On applying power the palms are turned a trifle outward and the arms are swept down and out in such a manner that after each has described an arc of about one-eighth of a circle the hands will be twelve to fifteen inches below water level. Then the muscles are relaxed, the elbows brought into the sides, the palms turned flat, and the hands first drawn toward the chest, next thrust out to original position.

The legs should be set in motion as the arms finish their pull. The knees are lowered and opened easily, without separating the heels; then the feet are bent upward and moved slowly apart; finally, with a combined movement, the legs are kicked out vigorously, so that they form almost a right angle, and snapped strongly together.

For the stroke to be perfectly timed the closing of the legs should occur as the arms attain full reach ahead, so that the body may shoot forward in nearly resistless position and glide along motionless for a brief space, on the momentum imparted by the kick.

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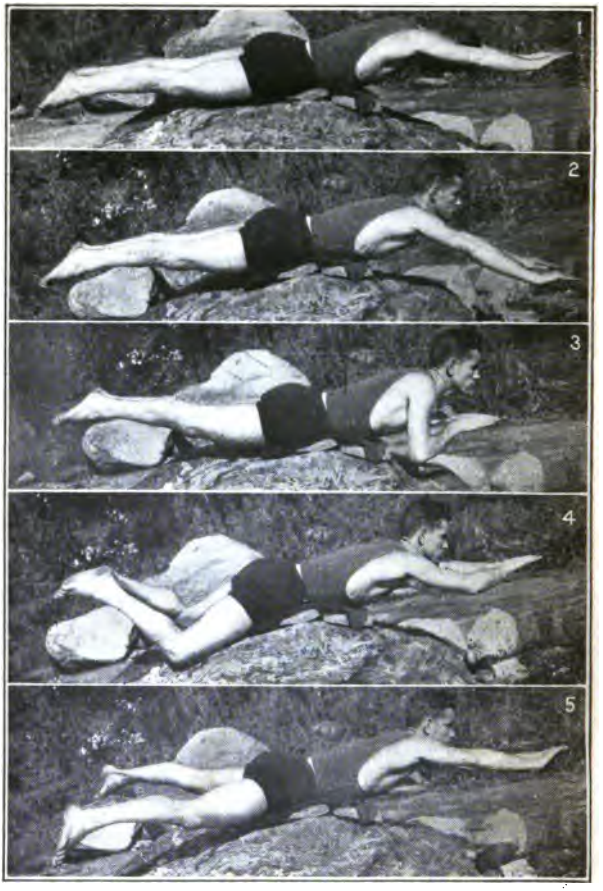

POSITIONS FOR THE BREAST STROKE IN THE WATER — 1. Shows start and finish.

With the breast stroke, breath should be inhaled by mouth during the drive of the arms and exhaled through the nostrils while the arms are recovering. Some instructors advocate twisting the head over the shoulder to inhale, but this causes the body to roll and gives a scissoring motion to the kick, which is against the racing rules and leads to disqualification in competition.

Breast stroke contestants will find it necessary to submerge the face after each arm drive, exhaling under water, and not again raise it until ready for another arm drive. In this position the entire body forms a straight line, offering a minimum of resistance.

Most of the breast stroke racing is done in this country in short pools and a swimmer will be hopelessly handicapped unless he can negotiate the turns with skill. He should first practice, therefore, approaching the end of the bath with arms extended in front, which is done by either shortening the stroke, or gliding up to the wall, if need be.

Upon reaching the end of the pool in the prescribed position the arms are swung to one side or the other, as inclination dictates, and simultaneously the elbows are then bent, the head is thrown up, the back arched, and the body rolled over. Then the hands are placed against the wall, one a little higher than the other, and the swimmer spins around, using his under arm to complete the turn and force himself back, with a quick side and out stroke, so that the feet will come into firm contact with the wall, six or eight inches be-

low surface. The arms are immediately thrust forward, the swimmer pushes off with energy, then glides for a while, body straight, face buried, before again falling into stroke.

In learning the breast stroke it is best to begin by practicing the movements on land, for they are hard to coördinate, and it will simplify the preliminary work to divide the stroke into three parts and count "one, two, three" while going through them.

Stand erect, arms raised over head, palms forward, hands touching. At "one," turn the palms a bit outward and lower the arms so that they will stop at a point slightly above the shoulder line and form an angle of about ninety degrees. At "two," bring the elbows close to the sides, move the hands inward until they are six or eight inches apart, and at the same time squat on your haunches, knees wide, heels touching. At "three," thrust the arms to starting position, and simultaneously make two little leaps in quick succession, straightening up and opening the legs with the first, snapping them together with the second. Breathing may be included in the foregoing practice by inhaling at "one" and exhaling slowly through "two and three."

Once familiar with the land drill it will be an easy matter for the person who has previously been taught the elements of natation to perform the breast stroke in the water.

SWIMMING ON THE BACK

SWIMMING on the back has not received in this country the attention it deserves. Very little effort has been made to popularize it, except for competitive purposes, and the average swimmer considers it a quite negligible quantity.

Yet this style of natation is of especial value in self-protection and lifesaving, besides offering unusual advantages in the way of physical culture. Nothing is more restful in covering long distances for pleasure or necessity than to turn on the back and paddle along easily, breathing freely and naturally, and using other muscles than those tired from work at a free-style stroke. Also, the best and safest carries evolved for supporting to safety the struggling victim of a drowning accident call for supine position on the part of the rescuer. And in swimming for exercise the various back strokes are particularly beneficial, because the wide, chest expanding arm movements enforce very deep breathing and give strong play to the pectoral, intercostal and abdominal muscles, developing and invigorating, thereby, the vital organs.

Probably the chief reason for the widespread neglect of the back strokes is the fact that the great majority look upon them as too slow and

too exhausting. But this is due primarily to lack of practice. The official record of 26 minutes 26 seconds for one mile clearly indicates that it is possible to attain great speed with training, and several devotees have demonstrated what can be done with these strokes over long courses, after adequate preparation, by figuring prominently in marathon races of from five to more than twenty miles.

There are several types of back stroke, but they may be classified into three groups. As names change with localities it is advisable to arbitrarily term them double half-arm, double full-arm, and alternate arm varieties. It will save confusion.

In the half-arm styles the arms start from the sides, are carried toward the head above water until at the height of the shoulders, then dip together and drive to starting position with a wide, near surface sweep. The legs either perform a kick similar to the breast stroke kick, drawing up, moving apart, then snapping together, or whip alternately up and down, as in the crawl thrash, as slowly or as rapidly as desirable.

In the full double arm strokes the arms are raised to full extension above the head before dipping, so that they describe a semicircle in driving, instead of an arc of ninety degrees, and any of the kicks used with the half-arm strokes are available.

The alternate arm varieties have been adopted almost exclusively for racing and there is no doubt that they save labor and increase efficiency.

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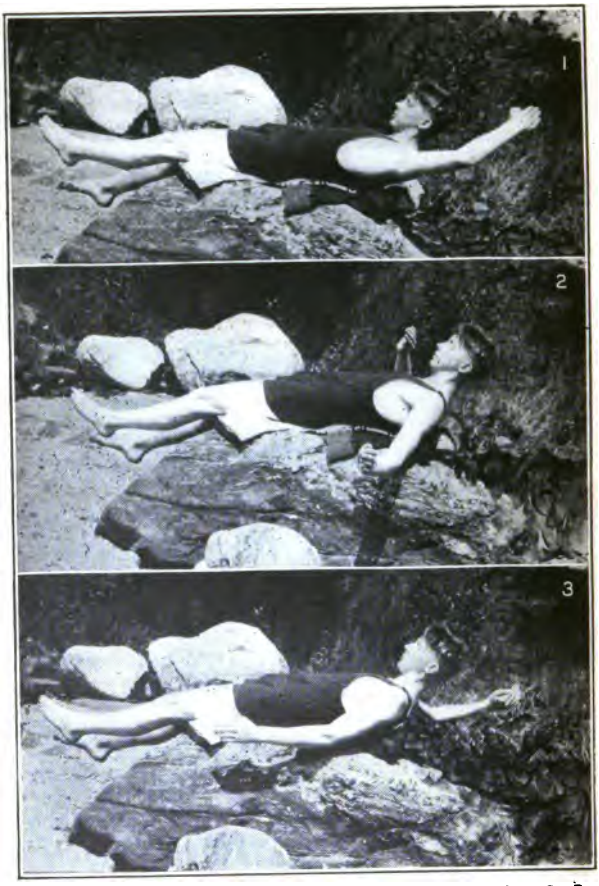

THE BACK STROKE CRAWL — 1. Arm at catch. 2. In mid-drive. 3. At finish.

They are virtually inverted forms of the crawl and trudgeon-crawl strokes.

Each arm starts from alongside, moves upward over the body and close to it; enters the water over the head, palm out, elbow slightly bent; then sweeps smartly to the thigh, still with elbow a trifle bent, seeking a depth of about eight or ten inches below surface.

The action of the arms is equidistant, one leaving the water in recovery as the other begins its drive. The swimmer rolls gently from side to side, dipping each shoulder to the pulling arm, in order to lessen muscular strain and obtain better leverage. The arms are carried over the body in recovery.

As mentioned, the alternate arm back strokes may be adjusted to any type of leg drive featured in the modern free styles, including the narrow crawl thrash of even scope, the mono-rhythm action of the single trudgeon-crawl, and the dual-rhythm drive of the double trudgeon-crawl, each subject to an optional number of beats per stroke.

It is necessary, however, when major scissors are sought, to give them little width, for power is wasted if the feet rise above surface, and the action becomes awkward if one rolls too heavily in trying to keep them submerged.

There is hardly need to point out that a swimmer should retain in swimming on the back the same leg drive which has proved best suited to him in free-style work. The movements are identical, although performed upside down, and the same timing of arms and legs must be followed.

No particular mode of breathing need be prescribed for the back stroke. The face is always above water, so one may inhale and exhale at any time, using either mouth or nostrils. Nevertheless, it is advisable to adhere to the method used with the free styles, for proper oxygenation of the blood, through the lungs, is essential, and the advocated method insures a full intake of air in inhaling and complete expulsion of noxious gases in exhaling.

The position of the body is most important, in swimming on the back, and should be carefully studied. Most people show a tendency to either throw up the head excessively, increasing the resistance and allowing water to splash over the face, or to sag at the hips, breaking the balance and causing a heavy drag. The body should be straight from shoulders to toes, the head bent forward just enough to enable the swimmer to plane.

Competing watermen should favor the alternate arm strokes, because they are faster, and because they do not materially affect speed and form in free-style swimming.

TRAINING FOR COMPETITIVE SWIMMING

SWIMMERS seem generally inclined to enter the competitive field without adequate preparation, often before they have even mastered a correct stroke, and this tendency has undoubtedly served to ruin the prospects of many a youth and maid having the necessary qualifications to attain the highest honors.

Allowing for natural ability, within reason, success in racing depends chiefly on form, and it is a great mistake for the novice to become a contestant until he, or she, has acquired it. The unavoidable faults incurred by a beginner can readily be corrected in the early stages, but they later become chronic, and it is then extremely difficult, if not impossible, to completely eradicate them.

Frequent work at slow pace is essential to the development of a good stroke, and no speeding should be attempted until all movements have been learned so thoroughly that they are performed instinctively. No swimmer unable to cover the furlong, at least, without tiring or losing form, should start racing.

Further, even proficient watermen should commence with practice at moderate pace when training for competition, and mingle fast and easy stretches throughout the period of preparation,

making time trials few and far between, and swimming as often as possible under the supervision of a competent coach, who will immediately call attention to the least break in style.

A fact which needs be strongly impressed on beginners and skilled swimmers, alike, is that a rapid stroke is not necessary to obtain speed, even in sprinting. It is the power put into the drive, not the swiftness of the action, that counts. The world's greatest hundred yarders all favor a comparatively slow arm stroke.

No general rules can be formulated in regard to the amount of work to be done in training for swimming. Some will thrive on a course which will send others stale in short order, and there must be taken into consideration, besides individual strength and stamina, the condition of the candidate at the time, the number of weeks or months available for practice, and the nature of the competition in sight, whether short-, middle-, or long-distance racing. Experience is the best teacher.

The great danger, however, lies in overdoing things, and here the symptoms are unmistakable — loss of weight below normal, tired feeling, extreme irritability, drawn features. At the first appearance of these warnings the training swimmer should take heed and let up.

Staleness is especially to be guarded against when an attempt is made to crowd into a brief period the work which should be distributed over two or three times as lengthy a course. If the swimmer starts early and gradually gets accus-

tomed to the required effort the chances of overworking are very small.

Training hard the year 'round is neither healthful, nor conducive to efficiency. The system eventually suffers from the continual grind. A rest of a couple of months in the spring and fall, between seasons, is always beneficial.

This does not mean, though, that the contestant should pass suddenly from constant activity to absolute idleness. One used to the exertion of training and racing actually needs exercise to keep well, and should let down gradually, but still do sufficient athletic work, not necessarily swimming, to remain fit.

For the rest, year 'round swimming will hurt no one, provided moderation is practiced. There are men and women aplenty who swim daily, indoor in winter, outdoor in summer, and attribute solely to this their vigorous health. But their work is done at slow gait, never under strain, while competitors are often obliged to punish themselves. That is what makes it advisable for the latter to seek an occasional rest, refreshing both mentally and physically.

A matter to which few training swimmers give thought is the harm attendant upon abuse of hot or steam room. Yet the abnormally high temperature saps the vitality at alarming rate and it is the easiest thing in the world to go stale through overindulgence. Probably in winter, when one enters the natatorium chilled and stiff, it is advisable to activate blood circulation by spending a few minutes in the superheated atmosphere, but

more is often injurious, and even a little is not necessary, for a warm shower or massage will better serve the purpose.

Another prevalent habit against which swimmers need be advised is that of loitering around the pool after being in the water. Sickness is courted in standing about on the cold tiles, wet, and often shivering. If one wishes to stay around it is the part of wisdom to first dry off, then don bathrobe and slippers.

The care of the eyes and ears is important, when bathing indoors, because it is impossible to keep a well frequented pool free from impurities, which are liable to cause inflammation and infection. It is a sensible precaution to wash the eyes on emerging from the water, and treat them with some antiseptic solution at the first sign of irritation. The ears may be protected with rubber shields — small devices in the shape of a mushroom — or by padding the inner chambers with cotton or lamb's wool.

Strict dieting, in the accepted sense, is not necessary when training for swimming. Every individual knows which particular foods are to him indigestible and should avoid them; but hearty, wholesome meals may be advocated, for a bit of surplus flesh increases buoyancy and imperviousness to cold, so is beneficial.

Smoking impairs the wind and should be stopped altogether; liquors, drugs, and stimulants are harmful and should also be given up entirely; dissipation of other kinds need hardly be preached against.

Plenty of sleep is indispensable to the competing waterman, as to any athlete, and no less than eight hours in every twenty-four should be devoted to it. A growing youth requires nine hours.

In preparing for racing it is well to begin paying attention to every detail from the first. Starting and turning, in particular, should be practiced often during the novitiate, that they may be perfected before the initial contest. In a sprinting event a good or a bad start may decide the issue, and in all pool races ability to negotiate the turns is essential.

A starting dive should be made with great energy, aiming to strike as far out as possible, but not too flat, or the acquired momentum will be checked. Sufficient depth should be sought to allow the body to cut the surface cleanly and to take advantage of the upward force produced upon full immersion by the swimmer's natural buoyancy. The exact angle of entry must be discovered through experimenting, for it varies according to the build and weight of the individual.

After striking the water the swimmer should glide for a few feet, instead of falling at once into stroke, and not try to come to the surface immediately, but in a long curve, arching the body gently and avoiding any abrupt change of position.

Just when to begin swimming is another thing which practice must teach, for some retain their diving speed much better than others. When the time comes to get into action, however, the crawl exponent will profit by starting on the leg thrash,

then bring the arms into play, while the trudgeon devotee should first use the arms, which are ready for the propelling movements, and follow with the legs, which must be opened in a negative movement of resistance before they can drive.

The earliest thing to practice in taking up turning is the approach. The end of the course should be reached with one arm extended in front, preferably the upper arm, and the swimmer must learn to estimate his distance carefully, so that he can come up in the wanted position by either adjusting the last few strokes or gliding up to the turn under leg power only.

The upper arm approach is preferable, because the swimmer is then able to take a good breath just before spinning round. But a contestant will profit by learning to turn on both sides, for loss of time is otherwise unavoidable when he happens to find himself in the wrong position on nearing the wall or board.

Several ways of negotiating the turns are in use and there is no great difference in their speed, but extensive experiments undertaken indicate that the following one is best suited to the majority: As the outstretched arm comes in contact with the wall the legs are drawn up and tucked under the body, the other arm simultaneously taking a side and backward stroke which throw the hips around and toward the wall. Then the feet are firmly planted, about ten or twelve inches below surface; the arms are brought together and thrust forward, palms down; and a vigorous push-off taken, the swimmer gliding for a space face down and mo-

tionless, or with feet fluttering, before falling into stroke.

Ability to judge pace is one of the most valuable assets of the competitor. It should be developed by study of one's work in practice. If a training swimmer goes under the watch whether he is speeding or moving at slow pace, and after each swim tries to compare the effort expended, the rapidity of the action and the time made, he will eventually learn to compute closely the relationship of these factors. Let it be clearly understood, though, that in advocating training under the watch there is no intention of suggesting constant time trials in the accepted sense, at high speed. Occasional fast work is imperative, of course, but most of the training should be done at moderate gait.

The perfect pace is that which enables the swimmer to evenly distribute his stock of energy over any given course and finish in good condition, but without an excess of reserve strength. Such pace will result in the fastest possible time. It is a mistake to distribute the power unevenly and sprint and slow up alternately; an even greater mistake to go too hard in the early part of a race, for when one begins to tire form goes to pieces and speed is then out of the question.

The perfect pace is not easy to estimate, and some never discover it, which is the chief reason for the erratic performances witnessed. But speed sense can be developed if one takes pains. The inconsistent performers are usually the swimmers who will not trouble to study their possibili-

ties and limitations. They do not know how fast or how slow they are going and never swim their own races, but follow blindly the pace set by opponents.

Generalship in competition is largely a matter of being wide awake to opportunities, of knowing the weaknesses of one's opponents, and of taking prompt advantage of unforeseen circumstance which may arise. It should not be confused with trickery, which a sportsman never resorts to.

Nervousness is almost a universal complaint with contestants and every effort should be made to overcome it, for there is nothing which makes greater inroads on the vitality or militates more strongly against efficiency.

Even veteran racing men will often work themselves into a state of fretful unrest when an important event is in sight, at times suffering to the point of losing appetite and sleep. This condition may be fought off by seeking absorbing occupation, or recreation. If the mind is kept constantly busy it will have no chance to dwell on the approaching contest.

A number of coaches advocate complete abstinence from all manner of exercise on the eve of competition, that surplus energy may be stored up, but the wisdom of such a course is questionable. Any one used to a daily swim feels the want of it, and an easy paddle will prove refreshing and limber up the muscles, without depleting in the least degree the supply of strength. Of course, punishing work should on no account be attempted.

Eating shortly before a race is dangerous. A light, easily digested meal may be taken two hours or more in advance, but even then great moderation should be used.

Warming up for a contest is advisable, particularly if the body is chilled or the muscle at all stiff. A hot shower at the last moment is advocated by some, but a brisk rub down, or massage, may be recommended in preference.

It is not within the power of every youth and maid to attain championship laurels in water sports, yet practice, application and perseverance will enable any normal person to develop sufficient speed and endurance to draw health and enjoyable recreation from the racing game.

LONG-DISTANCE SWIMMING

PEOPLE often marvel at the feats performed by long-distance swimmers, yet to a well-trained, up-to-date merman or maid the covering of long courses is child's play, for the modern, scientific strokes are practically effortless.

The main thing required to become an able exponent of aquatic endurance, after mastering a correct stroke, is to learn to hold a steady, even gait, by practicing frequently at slow pace. In trips of several hours ability to maintain an easy, unvarying, machine-like action is more important than strength or speed.

As in other branches of swimming, the beginner should adopt the type of modern stroke best suited to his, or her, individual characteristics and use it exclusively, so that it will eventually become second nature. It pays to rely entirely upon one familiar stroke, for on a long water journey the movements then grow mechanical, instinctive, and complete relaxation occurs between drives. A change of action may seem to momentarily afford relief, but it does not restore energy. If a swimmer begins to tire he should either turn on the back and enjoy absolute rest for a while, or, better still, stop altogether.

Careful consideration should be given to the

suit worn for distance swimming, because one that chafes at arms, shoulders, chest or legs will produce sores which are both painful and irritating. It is advisable to protect the head, and particularly the base of the skull, by donning a snug fitting rubber cap, so as to minimize the influence of either a hot sun or unusually cold water.

The question of training is one upon which no two swimmers appear to think alike, but competent authorities, as a whole, agree that it is desirable to avoid punishing trips in practice and usually confine the work to one and two mile stretches at fairly good speed. This method is recommended with reservations, however, for some swimmers appear to need a number of long and hard trials before they round into best shape. Each individual should solve the problem for himself by attempting both ways and carefully noting results.

Preliminary work for distance swimming should be started early, and those who find it monotonous to paddle up and down a short pool, when cold weather precludes outdoor bathing, should prepare by frequently indulging in some form of exercise, preferably in the open air, so as to gain physical fitness. When the last word is said, though, the best training for swimming is — swimming.

In the matter of diet inclination may be followed to a great extent. Weight is an advantage, and the practice of natation keeps the digestive organs in perfect order, so it is only necessary to exclude those foods known to be harmful.

Drugs, spirits and tobacco should be completely eliminated, as has previously been stated.

Whether to take nourishment during a swim of several hours is for the individual to decide. Some of America's most prominent watermen claim that the stomach is at the time in no condition to assimilate food and that eating often is the cause of nausea and cramps. They have made trips of more than fifteen hours without touching a thing. Others, nevertheless, partake of chocolate, coffee, beef tea, even solid food, and appear none the worse for it. Channel swimmers, for instance, usually have enjoyed full course meals in making or attempting the crossing. It is on record that when the Englishman, T. W. Burgess, accomplished the feat his menu included chicken broth, currant jelly, hot chocolate, white meats, grapes, champagne and a few other delicacies. It deserves mention, however, that Burgess and most of the other Channel swimmers did not keep up a steady pace, but stopped every half hour or so to rest, while the leading Americans swim continuously, without pause. It makes a difference. All considered, the evidence is in favor of eating lightly or not at all.

The established habit of smearing the whole body with heavy greases before a test of endurance is fortunately being abandoned by our foremost swimmers. Far from acting as a preventive to cramps, the thick coating tends to bring them on, for the pores become clogged and the poisons produced by the muscles in action find no outlet.

It is advisable to apply light grease, like plain

lard or vaseline, where friction occurs, and also where large arteries pass close to the surface, to decrease chafing and heat radiation; but the rest of the body should be kept free and allowed a chance to eliminate the mentioned poisons, which are the direct cause of fatigue, exhaustion and cramps.

A common complaint suffered by distance swimmers in the sea is "salt eyes." The constant action of the salt water first produces a smarting sensation, then gradually atrophies the optic nerves, so that temporary blindness at times results.

Goggles have been devised to obviate the trouble, but it is difficult to make them quite water tight, and the best means so far discovered for guarding the eyes is a mask of adhesive plaster cut to fit the upper part of the face, provided with isinglass lenses fastened with adhesive tape, and adjusted before entering the water by heating the outer edges, so that the mask will cling hard to the skin. It is not a comfortable article to wear, and gasoline is needed to take it off painlessly, but it offers absolute protection. Care should be had to treat the isinglass with anti-fog grease, from the inside, or moisture will condense on it and prevent clear vision.

Those who prefer to swim without goggles or mask should learn to keep their eyes closed. With practice one is able to hold a straight course without glancing up more than once in a while.

A swimmer about to attempt a difficult test should not rely solely on the guidance of others,

but himself study the course from every point of view, and go over it a few times in a boat if possible. Self-constituted experts with advice to retail can generally be found by the score, but they are more likely to mislead than to aid, and personal knowledge of conditions is most valuable. The man familiar with tides, currents, eddies, winds, and so forth, has a tremendous advantage.

Cold is the great enemy of the distance swimmer and imperviousness to it is essential to success. It may be developed by frequent work in water at low temperature, which in itself usually causes an increase of weight, and also by favoring foods known to build fatty tissues and develop body heat.

Ordinary granulated sugar is one of the best temporary remedies for either chill or fatigue. It acts as a rapid and harmless stimulant, promptly raising the temperature of the body, and it is not followed by the unpleasant reaction experienced after taking coffee, tea, or brandy, whiskey and other alcoholic beverages.

A reasonable amount of distance swimming may be advocated for all, not excepting children and middle aged men and women. There is no more beneficial form of exercise, provided it is done with moderation. When the modern strokes are adjusted to the slow action wanted to cover long courses there is absolutely no strain on heart or muscles, yet every part of the body is brought into play and profits by the exertion. The sport not only makes its devotees strong and healthy, but also confident, self-reliant, fully able to care

for themselves in the event of having to swim for their lives.

It would seem superfluous to reiterate that the trudgeon, crawl and trudgeon-crawl are the only strokes to adopt for endurance swimming, were it not that some prominent instructors still persist in claiming the superiority of the breast stroke for open water work. But let every swimmer and prospective swimmer remember that the former strokes are faster, more comfortable, and require less effort than the latter, as clearly demonstrated by the success of their exponents — men, women and immature boys and girls — in marathon racing and in tests of endurance against time and distance.

TRICK AND FANCY SWIMMING

TRICK and fancy swimming is seldom seen at club water carnivals, for the simple reason that amateurs are so anxious to succeed in the competitive field that they find little time to devote to anything but speed swimming.

This is to be regretted. The practice of exhibition feats not only develops finished watermanship, muscle control and confidence in the water, but it also furnishes eventually the means for entertaining others enjoyably. A display of skill and versatility in swimming always proves an acceptable addition to a public aquatic meet.

Ability in floating and sculling is indispensable to success in fancy swimming, for many of the prettiest tricks which can be performed call for a supine position, and propelling power must be gained without using full leg or arm strokes. It is necessary, therefore, to start by mastering these essentials.

The principles of floating are generally known, so they need not be touched upon, but very few swimmers seem to be well informed on the subject of sculling. This is the art of imparting momentum to the body by a twisting, rotary motion of the wrists and hands, when the arms are extended in almost any direction. In moving

head first sculling is done by first turning the hands flat against the legs, then bending the wrists at right angles to the forearms, palms down, and making a quick circular movement with downward pressure, which brings the hands back to original position. The upward movements should be made slowly, the downward vigorously. Greater power can be obtained by shifting the elbows up and down slightly as one recovers and drives. In sculling feet first the movements are reversed, when the arms are at the sides, the hands being turned palms down and worked under the hips, first bending them at the wrists, then drawing them up toward the shoulders and feathering them on the downward recovery. How to scull with arms over head will be described later.

THE DOG PADDLE

This is a simple trick, now in common use, for a number of instructors teach it as a stepping stone to the racing strokes. Nevertheless, it is generally interesting to the average crowd. The swimmer assumes the position of the breast stroke, body flat and head up, then works his arms alternately, reaching out in front along the surface, making a down and back movement with bent elbows, and recovering under water. The leg action is also alternate and imitates closely the motions made in walking up stairs.

THE LOBSTER STROKE

The lobster stroke is an inverted breast stroke. Again taking the flat, head up position, one

stretches the arms forward and sculls with the hands, turning them up and out, then whipping them away from the body with a rapid front and slightly inward drive. The feet are held toes out and perform an up and down alternate thrash like that of the crawl.

THE PROPELLER

In this trick the swimmer rests on his back and travels feet first. The body is adjusted to floating position, but with arms fully extended over the shoulders and head thrown back to prevent sinking of the feet. The hands only are used to drive. They scull by turning outward from the head, then upward, with the same rotary action already described. The feet are pointed and the legs are held straight, close together and idle. Difficulty is at first experienced in retaining equilibrium, for the feet usually drop; so it is advisable to sag a little at the waist until the balance is found.

THE STEAMER

Here one takes horizontal position, face up, arms at the sides. The hands scull rapidly beneath surface and the feet perform a very fast, energetic crawl thrash, coming a little above surface and driving down hard, so as to produce a frothing mass of foam and spray. The advance is head foremost, of course.

THE SUBMARINE

Assuming the same position, but keeping the legs motionless, one sculls with hands at the sides

until the body is well under way, when either leg is raised slowly upright, above water. Then the driving hands are turned gradually upward, so that little by little the sculling motions pull the body downward, presently submerging it to the point of leaving only the foot above surface, as a periscope. After sinking one may keep the attained depth by lessening the lowering pitch of the sculling, or come up by changing the direction of the hands to a downward sweep. The trick can be shown with both legs lifted, but it then requires unusual skill and power in sculling. Properly executed the submarine never fails to please, for it is possible to move up and down at will, performing evolutions the while.

LEAP FROG

Two men take part. The first floats face down, with arms and legs spread; the second swims up to him from behind, glides over him, grasps him by the shoulders, forces him under, then plants both feet on his shoulders and pushes him to the bottom, gaining thereby impetus to move forward and stretch out with arms and legs spread. The first man, meanwhile, shoots up from the bottom directly upon touching it and comes leaping to the surface, between the other's legs, promptly pressing over him and gliding on. This is repeated all around the pool and makes a good exhibition after practice has given it speed and precision.

THE PLANK GLIDE

Two swimmers take to floating supine, one grasping the ankles of the other, so that they form a straight line. The former then throws back his head and pushes himself under water, at the same time giving his partner a sharp pull which causes him to glide over, feet first. As the partner moves by, he reaches down and clutches the under man by the ankles, sinking himself, in turn, and moving upward, the trick being repeated a dozen times or so.

THE PENDULUM

The start is made in floating position, face up and arms over head. Then the arms are slowly brought down to the sides and the head is raised little by little and bent forward so that the whole body shifts gently from horizontal to vertical. Once straight up and down, the arms are slowly thrust out in front, the head is again lowered and the legs allowed to move up backward until the body is brought prone on the surface. The movements are then reversed, working back to starting position. One should aim at keeping the body straight at waist and using only the head and arms to effect the changes. Breath is taken while in upright position. With practice the pendulum can be swung gracefully and with clock-like regularity.

SOMERSAULTS

Front and back somersaults, correctly executed, invariably afford diversion to spectators. For

a front, take a deep breath, then draw up the knees close to the chest and lower the head sharply, falling into short, quick drives of the hands, wrists and forearms, upward, to help yourself around. For the back, bring up the knees, but throw the head upward and arch the back, driving with short strokes toward the feet. Somersaults made one after the other, without pause, are curious and amusing to watch.

Two swimmers can make the exhibition more interesting by performing somersaults in double. For back somersaults, one takes upright position, legs open; the other sinks behind him and places his head between the open legs, throwing his feet upward. When they are back to back, both spread their arms at right angles to the body and start to drive alternately in full, forward, circular sweeps, causing the locked bodies to rotate with ever increasing speed. For double front somersaults the two swimmers tread water face to face and clasp hands, then draw up knees and spin around without relinquishing hold on each other. It is an easy trick, but quite impressive.

SEAL STROKE

This is a stroke for under-water swimming. The hands are held at the sides and used for sculling, the feet perform a very narrow, fast, crawl thrash. When the movements have been thoroughly mastered it is possible to alter the direction of the body with ease and one may sink, come to the surface, or circle around, by merely shift-

ing the head a trifle and changing the sculling pitch.

BICYCLE SWIMMING

Lie on the side, with arms either crossed held down as if on the handle bar of a bicyc Then propel yourself with a pedaling moti like that of the dog paddle, giving force to t downward and backward movements.

WALKING ON THE WATER

The swimmer advances feet first, on the back, pulling himself along by the legs and holding the arms folded on the chest or thrown over hea l. The legs start from full extension, feet pointed, and drive by being bent sharply backward to kneeling position. They work alternately and it is all important to make the recovery very slowly, preferably raising the knees a bit at the end of the drive and bringing the feet gently back to the surface.

LOG ROLLING

Supine floating position is assumed, arms at full reach over shoulders, thumbs locked. Then a deep breath is taken and the body is started revolving by a twisting motion of the head and a sudden exerting of the waist muscles. Once rotary impetus has been acquired it can be maintained or increased with very little effort. It requires knack, however, to get the first turn without bending and swaying, and the trick is at its best when there is no perceptible wiggling or strain.

MONTE CRISTO

This feat generally causes a small sensation, yet any swimmer with some knowledge of underwater work can accomplish it. A large sack, comfortably accommodating the performer, is needed. A hole is cut through at its open end and through it are passed two pieces of cord. Then the exhibitor jumps in and surreptitiously takes firm hold of the loose cords; the sack is drawn over his head and the neck of it bound around and closed with the outward ends of the cords, tightly knotted. After a brief pause the imprisoned swimmer is suddenly cast into the water with a loud cry. As soon as he is submerged he releases the inward ends of cord he has been holding and this frees the neck, so that it can be pried open with a single quick movement. It is then a simple matter to emerge from the sack and come to the surface.

SPIRAL CORKSCREW

An exponent of the crawl stroke will experience no difficulty in learning the corkscrew. After the legs are set thrashing fast, and the body is under full way, the shoulders and hips may be used to impart a rolling momentum and the swimmer moves along turning from prone to supine, and supine to prone, in continuous revolutions. The corkscrew can be performed with or without arm movements.

THE WALTZING STROKE

This stroke is adaptable to either the trudgeon

or the trudgeon-crawl movements. It is on the principle of the corkscrew, but the revolutions are brought in as the legs perform the scissors kicks, making them spaced and rhythmic, as in dancing.

THE WHEEL

After taking back floating position, with arms over head, the shoulders are arched until the face is barely submerged. Then the arms are swept in circles, causing the body to wheel rapidly. Two full sweeps should give a complete circle.

THE TOP

Again back floating position, but with body sagging at the waist, chin on the surface, and feet above water. The hands then drive sharply, one toward the body, the other from it, thereby spinning the body rapidly around upon itself.

THE WASHING TUB

Is the same as the top trick, but the legs are crossed and the knees bent, so that they almost touch the chin.

ORNAMENTAL TEAM FLOATING

A group of floaters may give a most attractive exhibition by practicing team work and learning to pass from one formation to another with slight changes of attitude and position. The possibilities are unlimited and all that is needed is the arranging of a definite program which must be gone through until every member of the group

can execute the shifts rapidly and correctly at each signal of the leader.

A definite program is also advisable in individual displays, so that the tricks come in quick succession, without hesitancy or pause.

FANCY AND HIGH DIVING

THERE is not a more interesting and profitable form of exercise than fancy diving. The novitiate may be rather trying, for a bit of knocking about is inevitable before one grasps the principles of body control, but once the beginner has learned to enter the water with fair skill even the early practice becomes enjoyable.

The belief has somehow grown prevalent that ability to dive well is necessarily confined to athletic young men and women, but it is really within the scope of any normal person to acquire sufficient knowledge of the sport to make its pursuit worth while.

Certain natural attributes are needed, of course, to attain unusual success in the field of competition, but where only pastime and physical development are the aim, diving has virtually no limitations.

Very young boys and girls are especially fitted for it, because of the great limberness and resiliency of their muscles, and that it is possible for the middle aged to gain proficiency is proved by the fact that a few men and women, who did not take up diving until beyond youth, have figured prominently in championship contests.

The development of skill in fancy diving is

chiefly a matter of intelligent and frequent practice. The fundamental movements are not difficult to learn, but perfect timing is essential to execute correctly even the simplest dives, and this timing can only be learned and retained by constant and painstaking work. The best divers, indeed, are unable to display good and consistent form when out of practice.

The hours devoted to training are well spent, however. The brisk exercise benefits the functional organs, improves the health, builds strong and supple muscles, and makes for ease and grace of deportment; the state of activity demanded of the mind to prompt the muscle centers proves valuable schooling to one's mental faculties; the ever present danger of slaps and bangs serves to develop courage and assurance.

Furthermore, devotees of the sport eventually gain the means of entertaining others in pleasant manner, for a clever exhibition of fancy or high diving never fails to appeal to onlookers.

The most important piece of advice which can be offered the novice is to start from the bottom rung of the ladder and climb very slowly.

Beginners, as a rule, cherish the belief that the rudiments are superfluous; that they can save time and trouble by tackling difficult drives from the first, even though they have no conception of how they should be performed.

No greater mistake could be made. Neglect of the structural work only lengthens the road to success, when it doesn't actually bar the way to proficiency.

So many things have to be thought of in undertaking a complicated dive that it is impossible to remember them all, then give attention to setting the body for the entry. It is imperative, therefore, to study the plain dives exclusively until one is able to compose automatically, instinctively, when about to strike the water. Only then is it advisable to pass on to more advanced work.

The prospective diver who has never attempted a header should bend over for the first trial, arms pointed down and a little forward, then slowly overbalance and drop, without any effort to jump. The usual trouble with the beginner is to fall flat, and this is best avoided by bending down, then falling forward instead of leaping.

The proper way to perform the front dive, however, is the following: Stand at the end of springboard, feet close, toes bent over the edge, head erect, chest out, arms held loosely at the sides. Swing arms backward, rising at the same time on the ball of the feet, then thrust them forward, simultaneously springing up and out, head still erect, back slightly arched, legs straight, feet touching and pointed as in standing on tiptoe.

This position should be held until the weight of the head causes the body to curve downward. Then the muscles are stiffened, the chin is lowered a trifle, and one endeavors to pierce the water at an angle of 70 to 85 degrees, or just off perpendicular, with arms, head, torso, legs and feet forming a straight line.

The front dive is generally performed from a running start, in order to give it more life and

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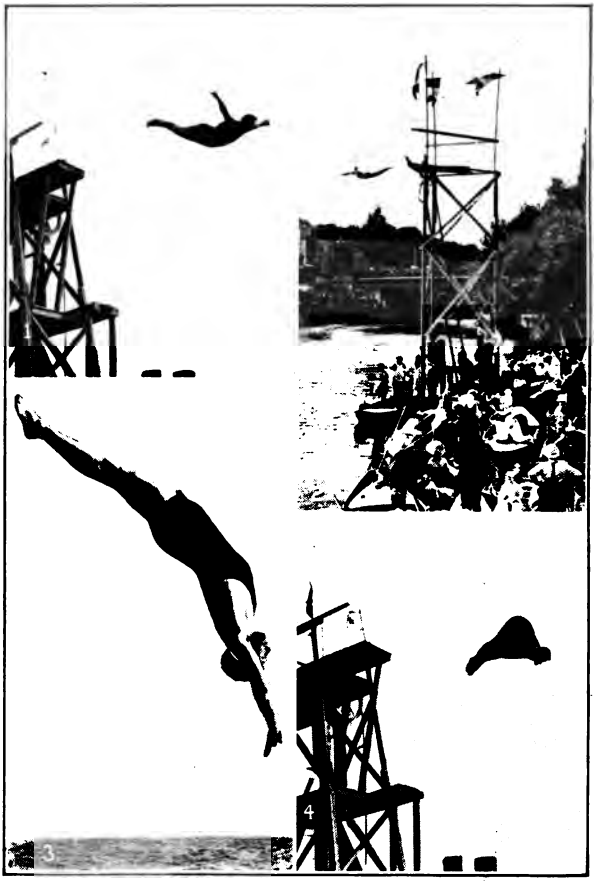

POSITIONS IN HIGH DIVING — 1 and 2. Front dive. 3. Back dive. 4. Forward jack knife.

action, and it is advisable to so practice it, after having studied it for a while from a stand. Take erect position at the foot of the board, run its length with short, well measured steps, alight with both feet on the end, then leap vigorously up and out, preferably throwing the arms at right angles to the shoulders, and holding them thus until near the water, when they are brought together for the entry described above.

The prevalent faults to avoid in the front dive are: bringing up the toes, instead of pointing them back; bending at knees or hips; opening the legs; dropping off the board, instead of taking off forcefully; springing only out, instead of getting good height; lowering the head in mid-air, or excessively in striking; hunching the shoulders; spreading the fingers; and moving any part of the body after striking and before full immersion. A diver should wait until the feet are covered, in all head dives, before raising head and shoulders to come to the surface.

The starting position of the back dive is similar to that prescribed for the front dive, except in so much as the shoulders are turned to the water, and the heels, instead of the toes, protrude over the end of the board. The spring is again made up and out, but the back must be arched a little more in flight, and care should be had not to sag at the waist in straightening out for the entry, or one will inevitably land flat. In performing the back dive it is important to go at it fearlessly, without attempting to guard against striking poorly, for any effort in that direction usually

results in a break of position, which is bound to cause a bad fall. The more boldly one undertakes this dive, the better the chance to execute it correctly. Eventually, an angle of 80 to 90 degrees should be sought for the entry.

The front jack knife comes next on the schedule. It is only a modification of the plain front dive. The body folds in the air, from the waist, so that hands and feet come together, then opens for the regulation entry. It is essential to spring high, in jacking, and to relax at the waist on leaving the board, so that the folding may be done without undue waste or strain. The beginner should try to regulate his movements so that the hips rise faster than the shoulders.

Chief faults in jacking are: crooking the legs at the knees, bringing up the toes, lowering the head in folding, and leaping too far out. The two first named are incurred even by good divers, and indicate lack of suppleness; the best way to overcome them is to take regularly some form of exercise which will limber up the renal and abdominal muscles. Landing far from the board is considered bad form. The competitive rules place a limit of six feet, beyond which no award is to be made by the judges.

The back jack knife is far more difficult, owing to the rear spring entailed, which is a style of jump hardly ever used except in diving. The take-off position is that of the back dive, but with arms outstretched in front, parallel, palms down. The leap should be made more up than out, immediately dropping the arms and shoulders

to jack, then thrusting the feet upward to open for entry, which should be vertical, with back to the board, of course.

Although close landing is one of the requisites of perfect jacking, the beginner should under no consideration try to conform with this rule until sure of body control. Particularly in the back jack, good outward momentum is desirable, or the least miscalculation may bring the head into collision with the board and inflict severe injury.

All fancy diving is based on varieties and combinations of somersaults, twists and jack knives, so after mastering the latter the developing diver should approach the front and back somersaults.

It is highly important before doing so, however, to understand the particular functions of each set of muscles in performing them, and the best plan is to first have an expert gymnast explain the points at issue, then place the acquired knowledge to the practical test, by trying a few tumbling feats under the latter's guidance, while safely supported by the suspended harness used in all gymnasiums for the purpose.

This part of the schooling should be short, for in alighting on land the knees and ankles are flexed to minimize the jar, both faults in diving, hard to eradicate once incurred.

Somersaults may be executed either by tuck or by lay-out. The former method is the easier and should be practiced at the start.

In setting for the front somersault by tuck the hands are closed and raised forward, a little above the shoulders, thus placing the elbows near the

sides, a few inches ahead of the body. At the moment of springing the chin is lowered quickly, the hands are jerked down, throwing the elbows backward, and the knees drawn up simultaneously toward the chest. This gathering (tucking) of the body under way, imparts to it a strong turning momentum and it spins around swiftly. The most difficult thing to learn is the exact time at which to open up for the entry, feet first. The somersault itself is accomplished readily enough after a brief course of tumbling, but a good deal of practice is needed to acquire the knack of unwinding at just the right instant to drop in straight and erect, with hands at thighs.

The back somersault, better known as back flip, is made by reversing the movements of the upper body. The head is thrown back, the torso arched, and the arms swung up, hands over shoulders. But the legs are not drawn up, just bent at the hips. In fact, the wider the circle described by the feet, the greater the turning impulse.

The somersaults by lay-out are performed with legs straight and arms at right angles to the shoulders. The only bending is done at waist and neck. The diver who has mastered the tucking process only needs to gradually lessen the crook at knees and elbows and put more vigor into the take-off.

A twist, in diving parlance, is a lateral roll of the body while in flight. It may be introduced into almost any dive to make it more difficult and spectacular.

A full twist, as the name indicates, involves a

complete revolution between spring and entry; a half twist is one in which a backward entry results from a forward spring, and vice versa.

It is essential in the twists not to begin revolving until the feet have left the board and to obtain the turning momentum chiefly from a quick movement of the head to the side one wishes to go. If one depends even partly on arms and legs there is bound to occur a scissoring motion which spoils the dive.

In fact, it needs be strongly impressed on prospective fancy divers that the head is the leading factor in controlling the actions of the body in mid-air. Its weight and position make it the directing power and enable the diver to change the angle of flight, roll, and even turn somersaults by bending it more or less abruptly up or down, to one side or the other. This should be always borne in mind, for besides facilitating the execution of any dive, proper use of the head will correct many false moves, without causing the ugly breaks incurred while attempting to recover by means of arms or legs.

Another fact which it is necessary to emphasize, is that height and vigor in taking off are indispensable to good fancy diving. Height is all important, because time is thereby gained to make even a complicated dive deliberately, gracefully, without scrambling through it. Both height and vigor combine in giving a diver's work form, finish and showy action.

The sport of high diving is restricted in scope. While it is possible for almost any normal man

or woman to attain some skill in doing the more simple dives from a moderate height, the executing of difficult feats, and especially the back dives, from a platform twenty or more feet above water, makes two things imperative: weight within reason and nerve one hundred per cent. proof. These qualifications are not possessed by all.

Weight is needed, because a person of light build not only finds it extremely hard to accurately control the body through the long descent, but is so affected by the action of the wind as to prove totally unreliable except under ideal conditions.

As to nerve, or courage, it becomes a necessity when diving from a tall structure, because unless the candidate is able to undertake the work with complete disregard of the consequences, he will never succeed in gaining proficiency. Every effort to avoid a jolt causes faults of execution, and one cannot very well develop ability by practicing incorrectly.

People often express wonder at the philosophical manner in which high divers take the hard knocks experienced in landing on face or back, apparently with sufficient force to crack the very bones. Yet if a diver is not prepared to stand the punishment with equanimity, and ever ready to come back for more, he cannot hope to achieve success.

Before attempting work from the elevated platform it is essential to undergo a course of instruction from the low springboard, say three or four feet high. Apart from the fact that it is much

easier to gain both form and confidence when the drop is small, there is actual danger in practicing from a lofty take-off if one is not familiar with the principles of body control.

Only after a diver is able to make correctly the somersaults and back dives from the low springboard should he start to increase his height, and then by degrees, beginning with the ten-foot stand and gradually going up.

It is advisable in tackling high dives to learn all the regulation forward ones before trying even the simplest back dives. In most of the latter one is unable to see the water, so the time to compose for the entry must be calculated instinctively, with no other guide than diving sense, and because this sense is only developed through long practice, the inexperienced high diver will save himself a deal of punishment by attacking the back dives last.

The somersault (flip) is the logical back dive to approach after the front dives. Besides calling for a foot entry, so that the chance of injury is slight, it allows a look at the water while in the air. Beginners, therefore, naturally go at it with greater assurance than they do at the plain back dive, in which one loses all conception of time or position on leaving the board.

The earliest aim of the prospective high diver should be to master a correct entry and recovery, for safety and improvement depend largely thereupon. The plain front dive offers the means.

Effort should be made in performing it to strike the water at an angle of about 75 degrees, for if

the slant is greater the shins and feet will receive a hard slap and cause a splash, while if one lands more vertically the legs generally whip over and the slap is then dealt to the calves. As in diving from a low board, the body should form a straight line from tips of fingers to toes and retain the position rigidly until completely submerged.

On nearing the surface, however, it is not sufficient just to raise the arms above head; one must bring the hands together, lock the thumbs, and set the muscles taut and hard. The sudden checking of the fast descending body, as it hits the water, causes such a terrific jar, that unless one is ready to meet it the arms may be sprung from their shoulder sockets, or a stunning blow administered to the skull.

The recovery is made as soon as the feet are submerged, by gently raising the head and arms, so that the body immediately curves upward. Some instructors advocate also relaxing the muscles directly after completing the entry, but one must be an expert to do it safely. Not only has this a tendency to throw the legs upward and shoot the diver toward the bottom, a dangerous thing if the water is not very deep, but if the relaxing is done abruptly, as head and hands are raised, the sudden shift of position may injure the spine.

In entering the water feet first the perpendicular should be sought, head erect, arms at the sides, hands against thighs, palms inward, legs straight, and feet pointed down.

When running dives are performed from a solid

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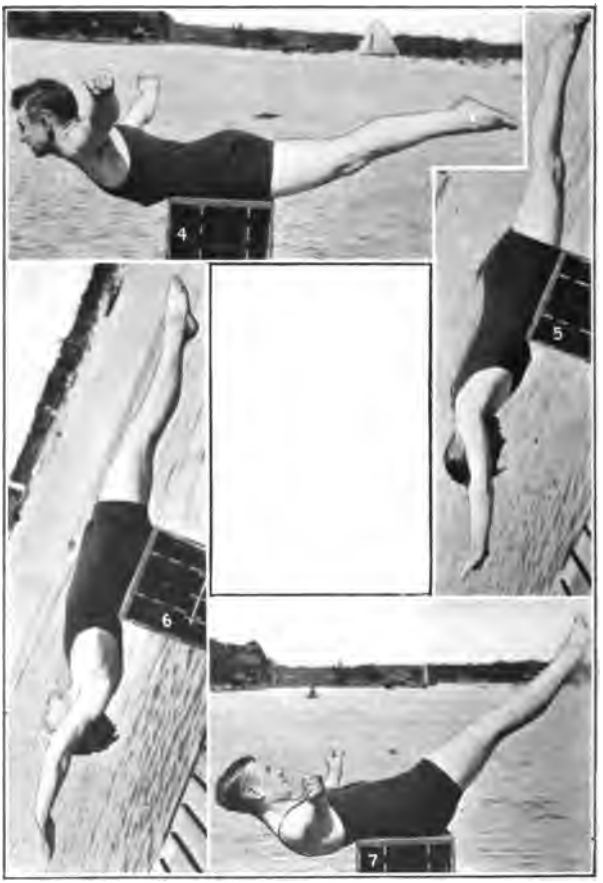

POSITIONS IN SPRINGBOARD DIVING — 4. Front dive. 5. Entry for front dive. 6. Entry for back dive. 7. Forward somersault by layout.

Starting position for the back dives.

Position to assume in the air for the jack knives.

Starting position for forward somersaults by tuck.

platform, without spring to it, one should take off with one foot, instead of both, as in a running jump, for it is otherwise difficult to leap hard and far enough to give the dive the wanted action and to clear the tower in the somersaults and jack knives.

Although the head is the controlling agent in high diving, as in springboard work, it is possible to effectively use the arms in altering the angle of descent. It can be done, when they are thrust out at the sides, by gently moving them forward or back, and the method has the advantage of being less noticeable than raising or lowering the head. Caution is needed in resorting to arm balance, however, for the inclination is strong to bend at the waist in shifting position and that ruins the form of the drive.

In practicing the somersaults from a height the lay-out style should be taken up from the start. Aside from its spectacular superiority, the position prescribed enables the diver to better see the water in spinning around, and so calculate more accurately the time for the entry. Furthermore, the method does not present the same difficulty it does from a low board, for the increased height affords every opportunity to go through the movements slowly and carefully.

In most high dives it is advisable to hold the arms cross fashion, for the attitude is both graceful and conducive to perfect control. The legs should be straight. Bending them at the knees is unsightly and it is also hard to remember to fully outstretch them when about to strike. This

virtually means performing the somersaults in jack-knife position, and the method facilitates clean execution, for one may turn or straighten out for the entry by a single movement of the head.

FLOATING

AMONG the necessary adjuncts to the aquatic education of every man and woman is floating, the act of resting supine on the water, motionless, or nearly so.

The qualifying "nearly so" is added with intent, because all human beings are not naturally buoyant. Some will sink even in salt water unless they perform supporting movements, virtually effortless though they may be, to keep themselves up.

The percentage of men heavier than water does not reach ten in a hundred, however, and it is even smaller among women, so it may be stated that the great majority can learn still floating, while the minority will be able to remain on the surface by resorting to slight paddling motions which make no material demand on the supply of energy.

Now let us consider what ability to float means to a person who either becomes exhausted when swimming far from shore, is seized with cramps, thrown unexpectedly into the water fully clothed, caught in a tide or current too strong to stem, or otherwise placed in danger.

If he, or she, is able to turn comfortably on the back, mouth above surface, free to breathe, the opportunity is gained to rest and recuperate, work

out the cramp, discard clothing, or await help in safety.

There is no doubt that many of the unfortunates who lose their lives by drowning would be spared if they had the ability and presence of mind to turn to floating when in danger, instead of using up their strength in a frantic struggle for existence.

It is the duty of every swimming instructor, therefore, to teach floating to the last one of his pupils and to impress on all the uses and advantages of this important branch of watermanship. Even individuals totally ignorant of the principles of natation may learn to float without trouble, and it will serve as a means of self-protection in case of accident, though they cannot swim a single stroke.

The knack is not difficult to acquire. Here is how to go about it if one must learn unassisted. Select a place where the water is waist deep; take a long breath, completely filling the lungs, and hold it; then throw out the arms cross fashion, palms down, and lean slowly backward. When the head is at water level push off gently from the bottom and raise the legs to horizontal position, so that the whole body rests flat on the surface. The push off should be both backward and upward, in order to impart a slight momentum, which increases buoyancy.

As soon as stretched out supine relax every muscle. Then, after waiting a few seconds to allow the body to adjust itself, so that the bobbing incidental upon dropping backward cease

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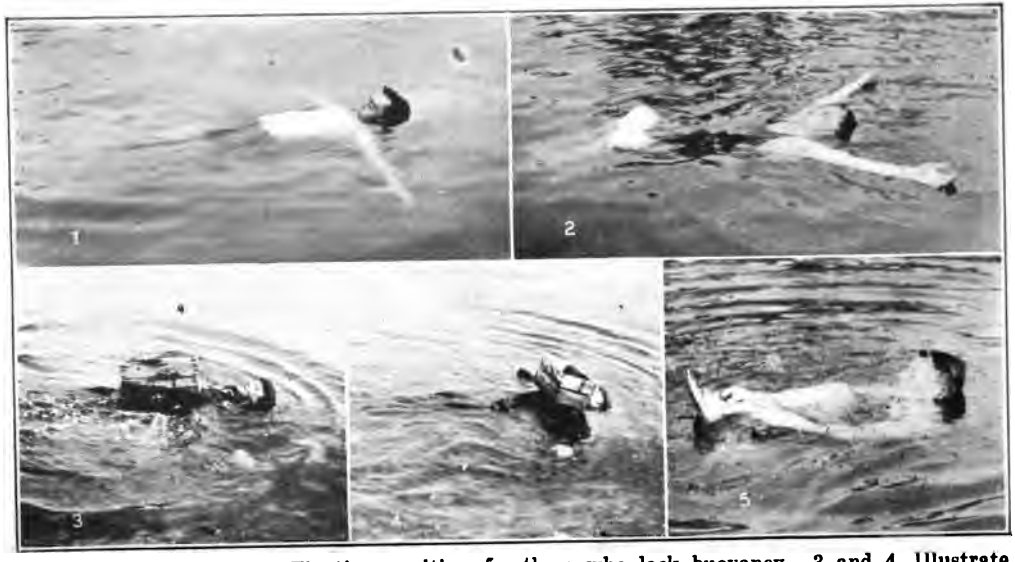

1. Floating position. 2. Floating position for those who lack buoyancy. 3 and 4. Illustrate buoyancy given by clothes. 5. How to take off shoes in water.

start breathing again, but without raising the head. Aim at expanding the diaphragm and forcing the inhaled air as far down as possible, as this gives the lungs greater capacity and also shifts the center of buoyancy toward the lower body, offsetting the natural tendency of the legs to sink.

Perform rather quickly the respiratory acts of inhaling and exhaling, but pause between each double act. That is, close the mouth tightly after taking in breath, and allow a little time to elapse before breathing out, so that the lungs will remain inflated most of the time.

If you are naturally buoyant, and the odds are better than ten to one in favor of it, you will be able to float at the first trial, provided you follow instructions closely and have no fear. But don't become nervous if water washes over your face as you stretch out. It probably will in the early stages. Just hold your breath for a few moments, however, and as soon as the body settles you will find your mouth above surface and clear.

Should your feet show a disposition to sink you can overcome it by moving the arms slowly upward along the surface, until they are extended above head, and if this does not suffice it will help to bend and separate the knees, allowing the body to sag a little at the hips. These changes generally establish the wanted balance, and it is often possible, after gaining it, to distend the legs, partly at least, and still retain it.

Those who experience difficulty in the bent knee position are probably too heavy for motionless

floating and should resort to a slow, alternate, flutter of the feet. The action is practically effortless, but it will prevent sinking.

When it is necessary to undress in the water one turns on the back, moving the feet up and down leisurely if needs be, and disposes of the upper garments first. A coat is seized by the lapels and worked off one shoulder at a time, then the hands are slipped behind the back and each is used to pull the sleeve from the opposite arm. The same method is followed to discard waistcoat or shirt and a woman's jacket or waist.

Footgear is taken off next. Low shoes can usually be pried loose by inserting the toe of one foot above the heel of the other and pressing down; laced or buttoned boots are removed by drawing up each leg in turn, knee to chest, so that the hands can reach them.

Trousers and skirts are unfastened at the waist, forced over the hips to below the knees, then thrust over the feet.

The need to undress, however, is never as pressing as most people seem to believe. In fact, no attempt should be made to discard clothing if help may be counted upon in reasonable time, or if one has the least doubt about being able to reach safety by swimming.

The opinion is widespread that clothes drag down, but the contrary is actually the case. Shoes or boots are a handicap; other apparel furnishes buoyancy and support.

This was demonstrated beyond question by experiments undertaken by the writer to settle the

point. A swimmer known to lack natural buoyancy was selected as a subject and asked to enter the water attired for the street, and assume floating position. He succeeded in staying up motionless for twenty minutes, and at the end of that period was able to bear without sinking the weight of such heavy articles as a wooden crate and a rowing scull.

Photographs of these experiments are reproduced elsewhere and illustrate graphically why clothes buoy up. It will be noticed how the trousers balloon above the knees, due to air imprisoned between legs and fabric. That explains the matter. In lesser quantity air is held inside the rest of the clothing also, so that the body is enveloped from shoulders to feet by a narrow stratum, which acts in the guise of a life preserver.

It will be obvious that the less movement made, the longer the various air chambers are likely to remain inflated, and that by taking to still floating a fully dressed person can rely on being supported for quite a while.

All things considered, it would be well if every one adopted for a water motto: "When in doubt, float." Whatever course circumstance may dictate later, it is the part of wisdom to first stretch out on the back and size up every aspect of the situation, that the best plan of action may be evolved. With muscles at rest and mind calm one is able to think straight.

PLUNGING FOR DISTANCE

THE element indispensable to success in plunging for distance is natural buoyancy. Weight and build are contributing factors.

The belief is general that only stout people make good plungers, but one might mention several tall and rangy men who won high honors in the field of competition, and there is no doubt that solid weight rather than superfluous flesh is desirable, because of the two conflicting quantities which enter into the consideration: momentum and water resistance.

Conceding, in fact, that a compactly built individual can attain starting speed equal to that of a stout plunger of the same weight, it will readily be seen that the latter's greater bulk will offer more resistance to the water and prevent his gliding as far.

Of course, between two plungers of similar conformation, but different weight, the advantage will rest with the heavier, for he retains longer the impetus gained from the dive.

Any one able to float can develop skill in plunging. The only other requisites are form and energy in making the dive, good wind, and knowledge of the correct position to assume and hold.

On taking the stand for a plunge one should

seek to expel all the vitiated air from the lungs by totally inflating and deflating them a few times. Just before starting, however, it is not necessary to fill them completely, provided the supply of oxygenated air absorbed is sufficient to allow one to hold his breath for one minute, the limit prescribed by the rules in this event. The more air inhaled, the greater the chest expansion and consequent resistance offered to the water.

Some of the most expert of our plungers have adopted the practice of making the last inspiration after leaving the platform, while in flight, in order to store no more air than absolutely necessary. But to the man of moderate buoyancy it is of greater importance to gain full floating capacity than to reduce displacement and he should inhale deeply before springing.

Those who find it difficult to stay submerged for the regulation period of sixty seconds may overcome the trouble by undertaking exercise which will improve their physical condition, eliminating smoking if they have the habit, and indulging often in deep breathing, particularly while walking outdoors.

It is a mistake to puff out the cheeks in plunging, as some do. Every effort should be made, instead, to force the air as far down in the lungs as possible, so that the center of buoyancy may be shifted toward the lower part of the body, the most inclined to sink.

A rather deep dive is advisable in plunging, but the actual depth to seek cannot be stated, for it varies with the individual. There is a definite an-

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gle of entry at which each individual encounters a minimum of resistance and it must be discovered through practice. Experiments indicate, however, that the more spring one takes, the lower should be the submersion, to avoid stoppage in striking, and the further one should remain under water, in order to avoid a check in rising to the surface.

The advantage of a deep dive can be explained. In sinking several feet the natural buoyancy of the body tends to thrust it upward, developing a force which combines with the forward momentum obtained from the dive and thereby produces a propelling force greater than that gained from a shallow dive.

In coming to the surface the plunger should avoid a sudden change of position and use the whole body, not the arms only, to curve upward. By very slowly raising head and arms and arching the back, one is able to obtain by degrees the wanted angle of ascent and so take full advantage of the lifting force of buoyancy. The impulse is greatly decreased if the shift is made abruptly, or if one floats up horizontally, with head and feet on the same level.

It has been ascertained that most plungers attain best results by going to a depth of five to six feet and calculating the under-water curve so as to reach the surface at between forty and fifty-five feet.

This does not mean, of course, that full depth should be sought on leaving the stand. One slants down to it gradually. It may be added, too, that though some instructors claim it overcomes grav-

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POSITION IN PLUNGE FOR DISTANCE.

ity to leap up as well as out in taking the plunging dive, any benefit thereby derived is more than offset by the unavoidable loss of forward momentum.

The body should form a straight line in striking the water and in gliding, so that hips, legs and feet will pass through the hole made by the head and shoulders, and it is important that the head be also held in alignment, for if it is bent or twisted there will be increased resistance and deviation from the true course.

The arms should be stretched out above head, — hands the least bit curved upward from the wrists, palms down, fingers close,— and held parallel. It is a mistake to either spread them too far apart or form them into a V; the same distance should exist between hands as between shoulders.

The legs are fully extended, knees straight, feet pointed, and separated a little, so that the heels will be in range with the center of the hips.

The muscles should be neither rigid nor completely relaxed. If the body is too stiff it will not retain its speed so long; if it is limp there will be sagging at elbows, knees and ankles, causing stoppage.

When it becomes necessary to return to a straight course, after deviating, a slight curving of the entire body in the wanted direction should be resorted to. The usual method of twisting the hands vertically and moving the arms to one side, needlessly affects progress.

Plungers who have plenty of buoyancy, yet find their legs dragging, should lift the head a little

and arch the back. This will usually bring the feet nearer the surface.

As success in plunging depends largely on the starting dive, every effort should be made to discover one's correct angle of entry, experimenting at various depths until the feeling comes of going through the water with no pressure on any part of the body except the head and shoulders. That is the feeling to strive for.

Plunging does not require especial training or dieting, but the wind necessary to hold the breath for one minute must be acquired. For the rest, practice only can lead to proficiency, though any form of exercise tending to give the leg muscles strength and elasticity, so that a maximum of starting speed can be gained on the dive, will prove beneficial.

WATER POLO

TWO styles of water polo are fostered in this country: the American or intercollegiate game, played by the teams of the Intercollegiate Swimming Association, and the international or soccer variety, officially adopted by the Amateur Athletic Union for affiliated clubs. In general character they may be said to present the difference which exists between rugby and association football.

College water polo is essentially a competitive sport. Tackling is permitted and scrimmages in close formation are its leading feature. This makes it a hard, manly, punishing type of contest, requiring of its devotees strength, good weight, stamina, all 'round watermanship and a bountiful supply of grit, for much of the battling is done under water. Not all swimmers qualify for it. Its scope is naturally restricted.

Soccer is more of a pastime. Ideally evolved to afford recreation, it lacks one of the popular elements of a competitive game, the personal encounter. The rules forbid scrimmages and one may not even interfere with an opponent not actually in possession of the ball, so offensive tactics cannot be subjected to the scientific treatment possible when mass plays are allowed, and the action is deprived of the excitement furnished both par-

ticipant and spectator by the hand-to-hand engagements. Nevertheless, soccer has the advantage of a wider range than college water polo. It demands of its followers speed in swimming, endurance, and skill in handling the ball, rather than physical power or courage, so almost any good swimmer, man or woman, may enjoy it and become expert.

There has been a great deal of discussion over the relative merits of the two games, but each has many good points and there is room for both among us. They appeal to swimmers of a totally different type and there are candidates enough in the field to give both a large following.

Rules for Intercollegiate Water Polo

RULE I. PLAYING AREA

Section 1. The length of the playing area shall be not greater than 75 feet nor less than 60 feet. The width of the playing area shall be not greater than 40 feet nor less than 20 feet. All pools shall conform as nearly as possible to these dimensions.

Note.— When pools have a *shallow end* it is advisable to *shorten* the playing area by placing a *spar with goal attached* across the pool so as to insure a playing area 6 *feet deep.*

Sec. 2. The following lines on each side of the playing area shall be plainly marked:

1. Centerline — equidistant from ends.
2. Four-foot lines — 4 feet from ends.
3. Fifteen-foot lines — 15 feet from ends.

4. Twenty-foot lines — 20 feet from ends.

SEC. 3. The two 20-foot areas at the ends of the pool shall be called the *goal zones.*

RULE II. THE GOALS

SECTION 1. The goals shall be boards 4 feet in length and 18 inches in height and marked in large letters with the word *goal.*

SEC. 2. They shall be located at the ends of the playing area 12 inches above the water level and equidistant from the sides.

RULE III. THE BALL

SECTION 1. The ball shall be the regulation white rubber *water polo ball,* not less than 7 nor more than 8 inches in diameter.

SEC. 2. It should be inflated *seven-eighths full* and free from oil, grease or other objectionable substance so that a good grip may be had on it with one hand, and it shall be inspected by the referee before putting it into play to see that the inflation is as described.

SEC. 3. The home team shall supply an official ball.

RULE IV. PLAYERS AND SUBSTITUTES

SECTION 1. The team shall consist of six players in the following positions: Center, Right Forward, Left Forward, Right Back, Left Back, and Goalkeeper.

SEC. 2. The captains must be *playing* members of their teams. All protests, all demands for

cessation of play for any purpose whatsoever, and notices of substitution of players must be made to the referee by the *captains*.

SEC. 3. A player may be substituted for another at any time, *provided that his side has possession of the ball*, or at any time at the discretion of the referee. Before entering the water the new player must report to, and be recognized by, the referee.

SEC. 4. Only *two* men may be substituted in any one championship game unless it is otherwise agreed by both captains before the *start* of the game. A player who has been removed during the game for other reasons than disqualification may be returned during the subsequent period.

RULE V. OFFICIALS

SECTION 1. There shall be the following officials:

Referee.
One Timekeeper.
Two Goal Umpires.
One scorer.

SEC. 2. The referee must be selected and mutually agreed upon by the official representatives of both teams. He shall be supplied with a whistle and pistol for signaling.

Note.— It is advisable for each league to have an approved list of officials from which to choose.

SEC. 3. The *umpires* shall call attention to any fouls, shall give evidence on the scoring of goals *if called upon*, but may *not* stop the game.

SEC. 4. The timekeeper shall be chosen by mu-

tual agreement of the two captains. He shall be supplied with a stop watch and whistle and shall keep time on the game.

SEC. 5. The referee shall have absolute supervision of the game, shall have the power to *reverse* any decision of an *umpire*, and shall call fouls when necessary.

SEC. 6. In case of a foul the referee shall indicate the offender and announce the *nature* of the foul, so that the scorer, offender, and spectators can hear him.

RULE VI. THE GAME

SECTION 1. The game shall consist of two periods, or halves, of 8 minutes each, with an intermission of 5 minutes.

SEC. 2. In the case of a tie at the end of the second period, the teams shall rest 5 minutes and then play for another period of *three* minutes, or as many such periods as may be necessary to break the tie.

SEC. 3. A captain, *provided his team is in possession of the ball*, may call time out without penalty up to 2 minutes for any purpose, but not more than twice in one period. On *resumption* of play the teams shall take positions *back* of their own 20-*foot lines* and the ball shall be given to the *goalkeeper* of the team having possession of it when time was called. Time occupied by disputes, repairing of suits, replacing of men, lining up for new start, and free throws from fouls, shall *not* be counted as time of play.

SEC. 4. When for any reason the referee

wishes to call time or stop play during any period, he shall sound the whistle or pistol. This signal shall immediately render the ball *dead*, and the ball so stopped shall not again be put into play except by the referee, who shall give it to the goal-keeper of the team having it last, both teams being *in* the water *within* their *own* 20-foot line when the play is resumed.

SEC. 5. Time shall be taken out whenever the ball goes out of bounds, time out to begin when the referee's whistle or pistol sounds calling the ball out of bounds, and time in again shall begin when the referee's whistle or pistol sounds calling the ball in play.

SEC. 6. The start at the beginning of each period shall be made by both teams lining up at their respective ends of the pool, *the visitors being given choice* at beginning of first period. The ball shall be placed in the center of the playing area by the referee and held there with a pole fitted with a ring, start for the ball being made only at the sound of the whistle or pistol. In case of a *false* start, teams shall line up as before. *Three consecutive false starts* by one of the teams shall constitute a *technical* foul. Teams shall change ends at half time and at the beginning of each extra period.

RULE VII. DEFINITION OF TERMS

SECTION 1. The ball shall be considered in play until it either leaves the playing area or the referee signals with whistle or pistol.

SEC. 2. To score a *touch goal* the ball must

be touched to the goal while in the possession of a player on the attacking side. To score a *thrown goal*, the ball must strike the goal board after being thrown by a member of the attacking team from *outside* the 15-foot line.

SEC. 3. After a touch goal or a thrown goal has been scored, the teams shall line up at their respective ends of the playing area and the ball shall be given to the *goalkeeper* of the side *scored upon*, and at the signal by whistle of the referee all the men of both teams must enter the water *immediately* from their respective ends of the pool *under penalty* of a *technical* foul and in 10 *seconds* the goalkeeper holding the ball must pass or carry it out of his goal zone. When the ball is in a team's own zone a player on that team may retain possession of it not longer than 10 *seconds* or until the umpire or referee signals by word, at which signal the ball must pass out of that goal zone or be forfeited to the goalkeeper of the opposing team.

Exception.— After a foul has been called, players on each team (with the exception of the free thrower) shall line up inside of their own 20-foot mark; and no player shall interfere with the ball or the free thrower while the try for goal is being made. After the free throw, whether successful or not, the ball shall be given to the goalkeeper of the team fouled against, the free thrower having first taken a position behind his own 20-foot mark. Play shall be resumed on signal from referee.

SEC. 4. If a team causes the ball to go out of the playing area, it shall be given to the goal-

keeper of the opposing team within his own 4-*foot line;* and the players of the team causing the ball to go out shall *not* be allowed within the 15-*foot line* until the whistle or pistol is sounded. No player shall leave the water when the ball goes out of bounds.

SEC. 5. The ball shall be kept *on or as near the surface* as possible and shall not be *intentionally* carried under water. If, however, a player with the ball has been forced under by an opponent, he may carry the ball as far as eight feet under water. The ball shall not be carried under water a greater distance than this under any circumstances. No goal shall be counted if scored on an *under water pass.*

No player shall hold on to the side or end of the pool except for the purpose of resting and shall take *no part in the play* while resting.

SEC. 6. No player except three backs of the *defending* side shall be allowed inside the 4-foot line until the *ball* is within it. When the ball is *within* this line no player *inside* this section will be allowed *artificial* support other than the *bottom* of the playing area.

SEC. 7. No player shall tackle an opponent unless said opponent *has possession of the ball* or is *within four feet* of the ball. *Exception.*—When ball is within the 4-foot section tackling may be allowed anywhere within this section. At other times a player in covering an opponent may block him, but shall *not* lay hands on him.

RULE VIII. FOULS

SECTION 1. Fouls are divided into three groups: personal, technical, and disqualifying.

SEC. 2. The penalty for a personal foul shall be two free throws at an *unguarded* goal from the 15-*foot* mark; each throw if successful will count *one point.* Personal fouls are enumerated as follows:

a. Tackling player who is not within 4 feet of ball.

b. Delaying the game after receiving notification to play by the referee.

c. Kicking intentionally or striking an opponent.

d. Holding under water for more than *ten seconds* any player who is within 4 feet of the ball. *Exception.*— A player who has *possession of the ball* may be held under 10 seconds or as *long thereafter as he retains possession of the ball.*

e. Unnecessary rough work.

f. Tackling player after goal has been scored or after game has been stopped for any reason by referee.

g. Use of abusive language to players or officials.

h. Player other than captain questioning any decision of officials.

SEC. 3. The penalty for a technical foul shall be a free throw at an *unguarded* goal from the 15-*foot mark,* which if successful will count *one* point. Technical fouls are as follows:

a. Crossing 4-foot line ahead of ball. (If player corrects this mistake at once, provided the

mistake has in no way affected the play, no foul shall be called.)

b. Holding on side or end of pool while engaged in scrimmage or while in *possession* of the ball.

c. Tackling a player by the costume.

d. Substitute failing to report to referee.

e. Swimming more than *eight feet* under water with the ball.

f. Three false starts on line up.

g. Four players *inside* their own 4-foot line when ball is *not* in goal section. *Exception.*— If the *defending* side fouls after the ball is *within* 4-foot line and a goal is *scored* the foul shall *not* count. If, however, the goal is *not* scored, the foul *shall* count and a free throw given to the *offended* side.

h. Failure to enter water according to Rule 7, Sec. 3.

i. Holding ball under water unless *tackled* by *opponent.*

j. Violation of Rule 7, Sec. 6, regarding artificial support.

k. Going under water with the ball before being tackled.

SEC. 4. A player may be suspended for the period or *disqualified* for the game by the referee for *unnecessary roughness* or for *unbecoming conduct* and his team *charged* with a *personal* foul. *A substitute shall be allowed for a suspended player,* but the suspended player may return to the game at the beginning of the subsequent period. When a player is disqualified a substitute *may* take his place immediately.

SEC. 5. Any player having oil, grease, or other objectionable substance on his *body* or *suit* shall be *disqualified.*

SEC. 6. If the attacking side fouls and before the foul is called a goal is scored by them, the loss of the goal shall be the only penalty, and the ball shall be put in play in the center of the pool as at the beginning of the game.

RULE IX. SCORING

SECTION 1. Goal values —

A touch goal will equal 5 points.

A thrown goal will equal 3 points.

A goal thrown by free throw after foul will equal 1 point.

SEC. 2. The team scoring the largest number of points shall be declared the winner.

SEC. 3. It is recommended that the home team provide a scoreboard of such dimensions and so placed as to enable players and spectators to follow the game more easily.

HINTS TO PLAYERS

The foregoing rules describe college water polo so thoroughly that nothing can be added and we may proceed to give a few helpful hints to prospective players.

The first step of the novice should be to learn water wrestling, for until he has some knowledge of how to handle himself in a scrimmage he is not fit to even start team practice and he should study both offensive and defensive methods, irrespective of the position he expects to fill, as it is always

advantageous to be able to shift, and a team is strongest when its every member can adequately take care of any duties allotted to him.

In offensive work the object is chiefly to elude or overpower one's opponent, thus gaining a road to the rival goal, and there are many ways to accomplish either purpose, but space prevents going fully into the subject. Here are the simplest and most effective, however:

When carrying the ball and about to be tackled a linesman should note the attitude of his antagonist, for it generally indicates with what arm he will seek a hold. Then, as the latter springs, said arm foremost, he should meet the leap by thrusting out the arm of the same side (being face to face it will be left for right, right for left), plant his open hand under the aggressor's armpit, and let the impact of the landing body sink him. Once submerged he twists around rapidly, at the same time forcing the other's arm over him and passing under it. He will find himself between his opponent and the goal, able to rest his feet on the latter and push himself toward the scoring board. It is important to be upright, not in swimming position, when meeting the tackle, or one will be cast backward, instead of down.

To overcome a rival guard or goaltender the attacking forward must aim at being the first to leap. He uses both leg and arm propulsion in endeavoring to rise high above surface, then hurls his body forward, one shoulder leading, and attempts to drop so that his armpit will rest on the other's collar bone and his arm encircle the latter's

neck, hand under chin. This lock secured he seeks a leg scissor hold around the body and has the prisoner at his mercy, for he can keep head above water, while the latter remains submerged and must eventually break away, giving his captor the wanted opportunity to dash for the goal.

Defensive tactics call primarily for the individual ability of each backfield player to stop the man against him, and the tackle just mentioned can usually be used most effectively by the two guards, but it is a bit risky for the goaltender, since it provides the very opening a forward needs for an underwater play. Hence, many competent coaches teach a goaltender to tackle low, obtain a body hold, then, with legs and one arm locked, feel around for the ball with the free hand and gain possession of it. As goaltenders are picked from among the biggest and strongest candidates, they are supposed to be able to wrest the ball from their lighter opponents, get loose, and send it out of danger.

In the early stages of the novitiate only two players should engage in water wrestling, alternating in attack and defense, and always using the ball, in order to master the art of handling it.

Later, though, three forwards may line up against three backs, as this teaches coöperation and develops team work. And this three to three practice should be continued after regular games are started, for it is the best means of perfecting offensive and defensive formations, as well as of familiarizing with the finer points of play.

The principle upon which every attacking for-

mation should be based is that all players are equal, in theory, and that it is necessary for one of the defensive men to be temporarily eliminated in order to score a five-point touch goal. Let it be remarked while on the subject, too, that it is advisable for a team to try principally for touch goals, because three-point thrown goals are difficult to make and they give the other side the big advantage of possession of the ball when missed.

The elimination of a rival back can be accomplished by massing on him, outwitting him, or so working a play that two of the defense men become engaged with a single attacking forward.

A method often used successfully is for two of the linesmen to bear down from opposite sides on either one of the guards, placing him between them. The forward behind him then ducks him and makes sure of his sinking to the bottom by placing both feet on his shoulders and pushing down. Before he can return to the surface the two make a dash for goal, a few feet apart, the one with the ball tackling the goaltender and simultaneously passing to the other, who touches the board for a tally.

The play must be fast and its success depends on the ability of the forwards to dispose of the back without his having a chance to seize either one or return to the fray before the goal is scored.

The defense for this attack is for the goaltender to rush to the assistance of the guard as soon as he sees it forming, and for the other guard to immediately take the goaltender's place under the

board, so that the balance of power is again established.

Another good play is for the man with the ball to enter the four-foot zone at a point beyond reach of the goaltender and for the forward on the other side of the pool to push off underwater at the same time, aiming to come up by the goaltender. One of three things will then generally happen: either the back guarding the side forward will tackle him too far from the ball to prevent a score and commit a personal foul, giving the attackers two free trials; or said forward will get the goaltender from behind and allow the man with the ball to sprint in and tally; or the goaltender will leave his post to engage the ball carrier, who can then pass to his fellow forward as the latter approaches the board and offer him a chance to touch it before the back is able to interfere. Executed correctly and accurately this play provides good opportunities under all circumstances.

A team having an unusually capable and powerful scoring forward will often profit by a frontal attack, the man with the ball trying to get through the goaltender single handed by the underwater route, and, if he is caught, holding the ball behind him and awaiting the help of his team mates, who must jump the goaltender and attempt to pry him loose. With some one clinging hard to his neck the latter is frequently forced to relinquish this grip of the fighting underneath player.

It is possible in water polo to work out an in-

finity of aggressive formations and for this blackboard practice is of great value. Particularly in the early season, therefore, the players should resort to it before practice in the water, so that new plays may be evolved and every member of the team be taught what to do in each, under all circumstances likely to arise.

In actual contest the captain should signal the play to be used, either by number, or, preferably, by some catch word that is not likely to convey information to opposing players after repetition.

One of the prevalent mistakes made by even experienced forwards is to allow themselves to be tackled in midpool, where they have no chance of reaching goal without being tackled again should they manage to break loose.

A forward should never enter a hand-to-hand tussle unless he believes a score may result. He only wastes valuable energy and it isn't necessary. In fact, when all players are in their proper positions, goaltenders under their boards, forwards on either side of the pool just outside the rival four-foot line, and centers near the enemy's twenty-foot line, one of the offense men must perforce be uncovered, so that when the player with the ball is attacked there is always an unguarded team mate to whom he can pass, and he should.

The place to fight it out to a finish and take punishment is under the board, where by retaining the ball there may at any moment be a chance to work free and score.

Another prevalent mistake made by teams too

weak to win, or by good teams having secured a lead, is to mass in their own territory for defense. They could not resort to worse tactics. With a dozen men mixed up in close quarters, and confusion reigning, the attacking forwards seldom have any trouble in finding or making an opening. Let it be impressed on every player that the best defensive game is a determined offensive one.

If it seems advisable to aid the backfield trio the task devolves upon the center forward, who is nearest. But unless the backs guarding the two side forwards start down the pool to take part in the offense, when they should be followed, it is important for the forwards to remain always close to the rival four-foot zone, where they belong.

A fault to be found with a great number of players is that they are not thoroughly conversant with the rules and often commit technical fouls unwittingly. This ignorance is at times costly. Quite a few close matches have been won through free trials awarded to the offended team owing to fouls.

A bit of advice which must be given to a small minority is to avoid unnecessary roughness. Some players seem to believe that the shortest path to victory is the partial drowning of their opponents, but the idea is fundamentally wrong. Not only does a rough player cost his side many penalties, but his very tactics prevent his paying the attention he should to team work, and that is a heavy handicap on his team mates.

It is due to an occasional display of unnecessary roughness that college water polo has gained the

name of being rather dangerous, but there is really hardly a sport in existence having a cleaner record. Serious injuries have never been suffered by its followers and even instances of slight hurts are very few and far between.

For the rest, the game is interesting to play and it has one most valuable feature not connected with sport. It develops competent and practical lifesavers, for any man who has learned to take care of himself in the gruelling scrimmages may be counted upon to ably perform the rescue of a drowning person even under the most difficult conditions.

SOCCER WATER POLO RULES

AS ADOPTED BY THE AMATEUR SWIMMING ASSOCIATION OF ENGLAND

Published by Permission of The Cricket Press, London, England

1. *Ball.*— The ball to be round and fully inflated. It shall measure not less than 26½ inches nor more than 28½ inches in circumference. It shall be waterproof, with no strapped seams outside, and no grease or other objectionable substance on the surface. The ball to be furnished by the home team.

2. *Goals.*— The width of the goals to be 10 feet, the cross-bar to be 3 feet above the surface when the water is 5 feet or over in depth, and to be 8 feet from the bottom when the water is less than 5 feet in depth. The goal posts and goal nets to be furnished by the home team.

3. *Caps and Flags.*— One team shall wear dark blue caps and the other team white caps. Both goal-keepers shall wear red caps. Each goal-scorer shall be provided with a red flag, and the referee with a dark blue and white flag and bell.

4. *Field of Play.*— The distance between the goals shall not exceed 30 yards, nor be less than 19 yards, the width shall not be more than 20 yards and shall be of even width throughout the field of play. The goal posts shall be fixed at least one

foot from the end of the bath, or any obstruction. In baths the half-way line and also the 4-yards penalty lines shall be marked on both sides.

5. *Depth.*— The water shall not be shallower than 3 feet.

6. *Time.*— The duration of the match shall be 14 minutes, 7 minutes each way. Three minutes to be allowed at half-time for change of ends. When the ball crosses the goal-line, whether it be a goal, corner throw or goal throw, it shall be dead until the re-start of the game or until it leaves the hand of the player taking the throw, and such time shall be deducted. Time occupied by disputes or fouls, or when the ball is thrown from the field of play or lodges on an obstruction, as per Rule 21, shall not be recokened as in the time of play.

7. *Officials.*— The officials shall consist of a referee, a timekeeper and two goal-scorers.

8. *Referee.*— The referee's duties shall be to start the game, stop all unfair play, decide all cases of dispute, declare fouls, goals, half-time, and time, and see that these rules are properly carried out. He shall decide upon all goals, whether signified or not. The referee's decision is final.

NOTE.— A referee may alter his decision provided such alteration be notified before the ball is again in play. A referee has power to stop play at any period of the game if in his opinion the behavior of the players or spectators or other exceptional circumstances prevents the match from coming to a proper conclusion.

9. *Goal Scorers.*— The goal scorers shall stand

at the side near each goal, and when they consider that the ball has passed through the goal or over the goal line, at their respective ends only, they shall signify their decision to the referee by means of a red flag. They shall not change ends, and shall keep the score of goals of each team at their respective ends.

10. *Teams.*— Each side shall consist of seven players, who shall wear dark blue and white caps respectively, and drawers, or costumes with drawers underneath the costumes. In baths, no grease, oil, or other objectionable substance shall be rubbed on the body.

11. *Captains.*— The captains shall be playing members of the teams they represent; they shall agree upon all preliminaries and shall toss for choice of ends. If they are unable to agree upon any point, the referee shall decide for them.

12. *Starting.*— The players shall enter the water and place themselves in a line with their respective goals. The referee shall stand in a line with the center of the course, and having ascertained that the captains are ready, shall give the word "Go," and immediately throw the ball into the water at the center. A goal shall not be scored after starting or re-starting until the ball has been handled (*viz.*, played with the hand below the wrist) either by two members of one team, in which case the scorer shall be within half-distance of the goal attacked, or by a player of each team. The ball must be handled (*viz.*, played with the hand below the wrist) by more than one player before a goal can be scored.

13. *Scoring.*— A goal shall be scored by the entire ball passing beyond the goal posts and under the cross-bar.

14. *Ordinary Fouls.*— It shall be a foul: —

(*a*) To touch the ball with both hands at the same time.

(*b*) To hold the rail or side during any part of the game.

(*c*) To stand on or touch the bottom during any part of the game, unless for the purpose of resting.

(*d*) To interfere with an opponent or impede him in any way, unless he is holding the ball.

(*e*) To hold the ball under the water when tackled.

(*f*) To jump from the bottom or push off from the side (except at starting or re-starting) in order to play the ball or duck an opponent.

(*g*) To hold, pull back, or push off from an opponent.

(*h*) To turn on the back and kick at an opponent.

(*i*) To assist a player at the start or re-start.

(*j*) For the goal-keeper to go more than four yards from his own goal line.

(*k*) To throw the ball at the goal-keeper from a free throw.

(*l*) To refuse to play the ball at the command of the referee after a foul or

after the ball has been out of the field of play.

NOTE.— Dribbling or striking the ball is not holding, but lifting, carrying, pressing under water, or placing the hand under or over the ball when actually touching, is holding. Dribbling the ball up and through the posts is permissible. Deliberate splashing on the face of an opponent is a foul under Clause D.

15. *Willful Fouls.*— If, in the opinion of the referee, a player commits an ordinary foul willfully, the referee shall at once order him out of the water until a goal has been scored. It shall be considered a willful foul to start before the word "Go," to deliberately waste time, or for a player to take up a position within two yards of his opponent's goal. To deliberately change position after the whistle has gone, with a view to taking advantage of an opponent. To deliberately splash in the face of an opponent.

NOTE.— In the event of a referee ordering a player out of the water and such player refusing, the game shall be stopped, the match awarded to the other side, and the offending player reported to his Association. In the event of a referee ordering a player out of the water for misconduct or a willful foul, he shall not re-enter after a goal has been scored except by permission of the referee.

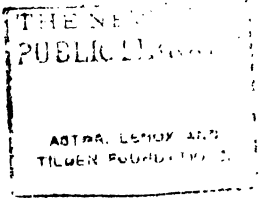
16. *Free Throws.*— The penalty for each foul shall be a free throw to the opposing side from the place where the foul occurred. A goal cannot be scored from a free throw unless the ball has been

handled (*viz.*, played with the hand below the wrist), by at least one other player, the goal-keeper excepted.

17. *Penalty Throw.*— A player willfully fouled when within four yards of his opponents' goal line shall be awarded a penalty throw, and the player who commits the offense must be ordered out of the water until a goal has been scored. The penalty throw shall be taken from any point on the four-yards line. In the case of a penalty throw it shall not be necessary for the ball to be handled by any other player before a goal can be scored, but any player within the four-yard line may intercept a penalty throw.

NOTE.— A player ordered out of the water for committing a willful foul must remain out until a goal has been scored, notwithstanding that half-time may intervene or extra time be played, except by permission of the referee.

18. *Declaring Fouls.*— The referee shall declare a foul by blowing a whistle and exhibiting the color of the side to which the free throw is awarded. The player nearest to where the foul occurred shall take the throw. The other players shall remain in their respective positions from the blowing of the whistle until the ball has left the hand of the player taking the throw. In the event of one or more players from each team committing a foul so nearly at the same moment as to make it impossible for the referee to distinguish who offended first, he shall have the ball out of the water and throw it in as nearly as possible at the place where the foul occurred, in such a manner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SOCCER WATER POLO.

that one member of each team may have equal chance of playing the ball. In such cases the ball must be allowed to touch the water before it is handled and must be handled (*i. e.*, played with the hand below the wrist) by more than one player before a goal can be scored.

19. *Goal-Keeper.*— The goal-keeper may stand to defend his goal, and must not throw the ball beyond half-distance; the penalty for doing so shall be a free throw to the opposing side from half-distance at either side of the field of play. The goal-keeper must wear a red cap. He must keep within four yards of his own goal or concede a free throw from the four-yard line to his nearest opponent. The goal-keeper is exempt from clauses (*a*), (*c*) and (*f*) in Rule 14, but he may be treated as any other player when in possession of the ball. Except when injury or illness compels him to leave the water (when Rule 23 shall apply), the goal-keeper can only be changed at half-time.

NOTE.— In the event of a goal-keeper being ordered out of the water, his side cannot appoint another goal-keeper except at half-time, as defined in Rule 19, and any player defending the goal in his place shall be considered an ordinary player and not come under the special limitations and exceptions attached to a goal-keeper.

20. *Goal Line Corner Throws.*— A player throwing the ball over his own goal line shall concede a free corner throw to his opponents, and such free corner throw shall be taken by the player on the opposing side nearest the point

where the ball leaves the field of play, if the attacking side throws the ball over it shall be a free goal throw to their opponents' goal-keeper.

NOTE.— In the event of the ball having become dead by being thrown over the goal line, it must not be considered in play until it has left the goal-keeper's hands. If a goal-keeper puts the ball in play, and, before any other player has handled it takes it again and allows it to pass fully through his goal, a corner throw shall be awarded to the opposing side.

21. *Out of Play.*— Should a player send the ball out of the field of play at either side, it shall be thrown in any direction from where it went out by one of the opposing side, and shall be considered a free throw. The player nearest the point where the ball leaves the field of play must take the throw. Should a ball strike an overhead obstruction, and rebound into the field of play it shall be considered in play, but if it lodges on or in an overhead obstruction it shall be considered out of play, and the referee shall then stop the game and throw the ball into the water under the obstruction on or in which it had lodged.

22. *Declaring Goals, Time, Etc.*— The referee shall declare fouls, half-time and time by whistle; goals by bell. The time-keeper may notify half-time and time by whistle.

23. *Leaving the Water.*— A player leaving the water, or sitting or standing on the steps, or sitting on the side of the bath in which the match is being played, except at half-time or by permission of the referee, shall not re-enter it until a goal

has been scored, or until half-time. Should a player leave the water he can only re-enter at his own goal line. Any player or players leaving the water during the progress of a game without permission of the referee (except in case of illness or accident), or refusing to enter the water at the request of the referee, shall be deemed guilty of misconduct, and be liable to suspension by the body governing the particular match in which he is competing.

HINTS FOR SOCCER WATER POLO

The essential qualification for soccer water polo, granted the necessary speed and endurance in swimming, is ability to adequately handle the big, slippery leather ball.

Especial skill is required, because, with the exception of the goaltenders, the players are only allowed to use one hand at a time. The novice, therefore, will profit by learning to dribble, pick up, pass and throw goals before attempting to line up, that he may have the chance to practice unhampered by the interference unavoidably encountered in actual play.

Dribbling is the art of advancing the ball while swimming, and is done by bunting it with the head and keeping it on a true course by swinging the arms on either side. As a dribbling player is not considered to have possession of the ball and may not be stopped or interfered with, proficiency is of the highest value.

Picking up the ball quickly and surely is one of the difficult and most important things for the

beginner to learn. It can be done by placing the hand under it, palm up, fingers and thumb spread; resting the hand on top and rolling it rapidly outward and downward, so that it comes to balance on the upturned palm; laying the hand on the off side and lowering the elbow, thus obtaining a grip between fingers and forearm.

Care should be had in using the two first methods to see that the ball is steadily balanced before passing or throwing, otherwise the shot cannot be made hard or true.

Passing and throwing should be practiced from all positions. Players generally develop a style of their own, natural inclination leading each to favor shots best suited to his individual characteristics, but versatility is of great advantage and should be acquired during the novitiate.

A maximum of speed and accuracy can be given to forward shots from almost upright position, but backward shots in the same position are very effective, though less easy to place. The forward shot is best made by drawing the arm well back, leaning a little to the opposite side, then throwing with straight arm nearly parallel to the surface and allowing the full weight of the shoulder to follow. The backward entails virtually reversing the movements and it is necessary to seize the ball between fingers and forearm, or a good shot will not result, for the twisted arm is unable to balance securely.

From swimming position a short, quick, forward flip may be executed by tossing the ball from under, or resting the hand on top, rolling it half way

back, then propelling it with a snappy up and out motion of wrist and forearm. But for a long pass or a hard throw in this position back-hand work is imperative. The ball is picked up in any one of the ways mentioned that the approach makes most practical, then hurled back or across the body, the right arm being used to shoot to the left, and vice versa. It is helpful to roll the body in throwing, for it adds impetus to the ball.

One of the safest positions from which to throw is flat on the back, arm stretched overhead. This not only gives a clear view in front, but makes it extremely difficult for an opponent to draw near enough to prevent a clean throw or stop it.

Beginners need be warned against looking at the ball, instead of where they aim, when throwing. Particularly at first, before they have learned to balance instinctively, most of them are inclined to watch the pick up and shoot blindly, naturally missing the objective by a wide margin.

After becoming adept in handling the ball and playing for a while in practice games, the time comes for the developing recruit to select the post for which he is best fitted and gain familiarity with its especial requirements.

Sprinting speed, agility, aggressiveness and ability to pick up swiftly and shoot with utmost accuracy are the traits which proclaim the ideal forward. Strength of throw is less important, particularly in the wing forwards, for they are almost invariably within a very few yards of goal, where perfect placing counts for more than hard shooting.

The center back holds the most trying position on the team and he should be chosen from among the headiest and most resourceful candidates, expert in both offense and defense. He must not only be fast, but unusually endurant, for a great share of the work falls upon his shoulders. He must be experienced, because his judgment must tell him at all times, on the spur of the moment, where and how he can be of most use; he must be quick and clever in passing, for upon him first devolves the duty of sending the ball out of danger as soon as it enters his territory; he must be able to make long and true throws, for he will often be called upon to try for a goal shot from midpool, when the forwards are covered and he has a more favorable opening than they. He is really a combination of forward and back.

The two wing backs should be steady and reliable, rather than brilliant players. Unwavering attention to both the ball and the forwards they cover is demanded of them; if they are inclined toward grand stand play, leaving their opponents to attempt scooting down the pool for a try at goal when they gain possession of the ball, their ambition will eventually prove costly. Their duty is chiefly to deprive the men against them of the ball, that they may feed it to their own forwards, and it is desirable that they be heavy and powerful, for defensive tactics, as well as able to throw far from any position. Distance is really more to be sought than accuracy — in the wing backs, because the longer their shots, the better the chance of the ball's reaching the awaiting forwards.

For the goaltender's post a tall player with exceptionally long arms is naturally preferable, for the opening to protect is large. He must have a quick eye to anticipate the direction of the incoming ball and move to meet it; be able to place accurately, rather than throw hard, for he is not allowed to pass beyond midpool; above all, have good judgment. It is quite as important for him to realize instantly where to send the ball when he receives it as to stop shots. Further, he should study closely the work of his backfield men, know what to expect of each, and use them according to circumstances.

In entering a game all players should take their allotted positions without delay. The wing forwards will at once dash down the pool to station themselves three or four yards from the rival goal line, not too far to the sides, so that a high pass may enable them to strike the ball on the fly and drive it through the bars, and a low one to score on a short, quick shoot from pick up. The center forward, after flipping the ball back into his own territory, if he swims for it and gets it, proceeds to a point seven or eight yards from the opponents' goal. The backs move up immediately to meet the rival forwards and stick to them.

As in college water polo, it is well for all players to try to work clear of opponents when their own side has the ball, and to close in on the latter when the ball is lost, but the backs should never risk getting too far away or a fumble may prove fatal.

Team work is patently essential to success in soccer. While the game is a man-to-man contest,

it is possible for fellow players to develop such a keen mutual understanding that they will know how to anticipate one another's actions, take advantage of the knowledge, and baffle the opposition by their swiftness in seizing opportunities.

For the attainment of perfect team work it is necessary for every man to unselfishly sacrifice personal glory and aim always at letting the player score who has the best chance, aiding him fully. The policy should not be carried too far, however. Some backfield players are so imbued with the idea that it is not their place to throw goals that they will neglect the best opportunities and pass to guarded forwards, who are not nearly in as good position for a telling shot. This is a mistake. A clear opening should never be missed.

An important phase of team work is shifting positions. Changes on the forward line will often confuse the defending backs and temporarily leave one of the attackers uncovered and free. They should be practiced regularly on carefully laid out plans, so that they may be executed without a hitch.

At times shifts are made necessary. It happens now and then that an opponent will get away from his man and start down the pool with the ball. There should then be an immediate readjustment of the players, the one nearest taking the free rival and as many others as required changing company until all hands are again coupled off.

Indispensable to combination play is good leadership on the part of the captain and prompt obedience to his orders by every member of the

team. The best captain is not always the most brilliant player. A successful leader is the man of experience, who can swiftly determine what tactics to employ under all circumstances which may present, who is ever alert and awake to opportunities, and who has the confidence of his team mates. He should have absolute control of his men.

More than in any water game, detailed knowledge of the rules is demanded in soccer, because they are so complicated that one not thoroughly versed in them will cause unending penalties to be imposed on his side.

The fouls chiefly to be guarded against, however, are tackling, holding, or interfering with an opponent not in possession of the ball; pushing off from the sides of the pool; changing position after the signal to stop playing; catching the ball with both hands; seeking artificial support; and taking the ball underwater when tackled. These are the breaks mostly committed in match games.

It deserves explaining, though, that the rule against taking the ball underwater applies only to being pushed under by an opponent while in possession. There is nothing in the code to prevent carrying the ball beneath the surface when no rival is within reach.

The question of training for soccer is of paramount importance. A match only calls for two seven-minute periods, fourteen minutes of actual play, outside of time used up in interruptions for fouls, lining up after goals, throws out, etc., but throughout those fourteen minutes the players are

incessantly dashing around, mostly at top speed, and without a chance to rest. It takes a swimmer in the very pink of condition to stand the constant strain without becoming exhausted.

To adequately prepare for soccer one should start work weeks before the first game is scheduled and gradually become accustomed to daily swimming from 200 to 500 yards at moderate pace, with 25- and 50-yard dashes frequently added to develop sprinting ability. It is also excellent practice to often try getting under way with a leap from a treadwater start, as securing the jump on an opponent usually means having first go at the ball.

For the rest, conditioning methods for swimming have been fully described in a previous chapter and they will serve as well for soccer water polo.

LIFE SAVING

LIFE saving may be divided into four parts: 1. Rescue of the drowning, comprising the approach to a person in danger, the location of a sunken victim, towing the subject to safety, and the land carry. 2. Self-protection, including the methods by which to guard scientifically and humanely from the attacks of those one would resccue. 3. Resuscitation, embracing all means for restoring the apparently drowned. 4. After treatment, embodying the ways to care for the rescued, after resuscitation, in order to hasten their recovery from the great mental and physical shock sustained.

To adequately prepare for life saving work it is necessary to undergo a complete course of preliminary training, so as to develop ability in every required branch of watermanship.

It is essential, for instance, to master breath control under swimming conditions and learn to instinctively inhale and exhale at the right time.

An excellent plan for the purpose is to practice "bobbing" in a depth of eight or ten feet, where solid bottom is available. Start from treadwater position. Take a deep breath; rise well above water by using arms and legs to lift yourself; close the legs sharply with feet pointed; throw arms above head and sink feet first to the

bottom. As soon as toes touch, crouch, then spring upward. Upon returning to the surface exhale and inhale rapidly, rise again above water, and promptly sink once more to the bottom. Practice this for several minutes at a time.

Skill in floating is indispensable in life saving, and how to acquire it is told in a previous chapter on the subject.

A powerful leg drive is also all important, for the rescuer must often propel himself without using the arms, so it is advisable to practice covering one hundred yards, or more, either on the side or back, with arms motionless.

The life saver's stroke, however, which may be resorted to when the subject is exhausted or unconscious, permits the use of one arm, while the other is devoted to supporting the rescued person. Most swimmers who breathe on the right side will find it easier to propel with the right arm and tow with the left. The rescuer rests on his side and executes the scissor kick with the legs.

Ability to make a deep dive from the surface, so that a sunken victim may be reached, is indispensable. Start from treadwater or swimming position. Lift yourself high, as for bobbing; bring arms together before you, palms down, thumbs touching; then, simultaneously point arms toward the bottom, lower head abruptly, and throw legs upward. As soon as shoulders are under water fall into the movements of the breast stroke to continue downward. It is splendid training to frequently try surface diving in con-

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1, 2 and 4. Life savers land carries. 3. How to secure the carries in the water. 5 and 6. The Schaefer method of artificial respiration.

junction with finding, raising and carrying ashore a ten-pound weight dropped for the purpose.

To guard against being caught in the clutches of a drowning person rendered frantic by fear, one must develop skill in water wrestling, which teaches not only how to break holds without injury to the victim, but also how to secure firm, controlling locks.

The brutal and ignorant practice of attempting to knock out a struggling drowner is all too often advocated. It should under no consideration be resorted to. In the precarious physical condition brought about by the terrible ordeal of drowning a smashing blow is very apt to prove fatal. If the rescuer believes it for any reason unwise to close in with a panic-stricken victim let him stay watchfully out of reach until the latter's own struggles have exhausted him and made him helpless.

In the majority of cases it is possible to circle around the struggler, approach from behind, and apply in perfect safety one of the virtually unbreakable back locks presently to be described. At times, though, even expert life savers are seized, accidentally or through carelessness, and it is then imperative to know what to do.

The following releases should be practiced with a friend, who will take the holds to be eluded:

When caught around the neck, plant your hand under the encircling arm, above the elbow (Fig. 1), and vigorously thrust said arm upward and

over your head, so that you will find yourself behind your assailant (Fig. 2) in position to place a secure back lock on him.

If seized by the wrists (Fig. 3), raise your hands, then jerk them down with forceful outward twist, against the other's thumbs (Fig. 4). This will free you (Fig. 5).

Should the grip be higher up on your arms, rest both feet on the struggler's body and push off with steady pressure (Fig. 6), but don't make it a kick.

In the event of being grasped around the shoulders, arms pinned under (Fig 7), thrust the elbows violently up and out (Fig. 8), or rest hands under subject's arms and press suddenly upward. Either method will shoot you downward, out of the embrace, and a quick movement in the right direction will bring you to the surface in back of the struggler (Fig. 9).

If the same hold is below the elbows and you are face to face (Fig. 10), work out one arm (Fig. 11), place the palm of your hand on the other's chin (Fig. 12), and press his head backward with steady, increasing force until he lets go. If your shoulders are toward him try to spin around quickly, so as to be able to use the same release. Failing this, snap out your arms with an upward motion, seize one of his wrists with both your hands, then twist it hard and evenly, without any quick movements which may cause break or dislocation.

In case of a neck lock from behind pry loose one of his thumbs or fingers (Fig. 13) and rotate it

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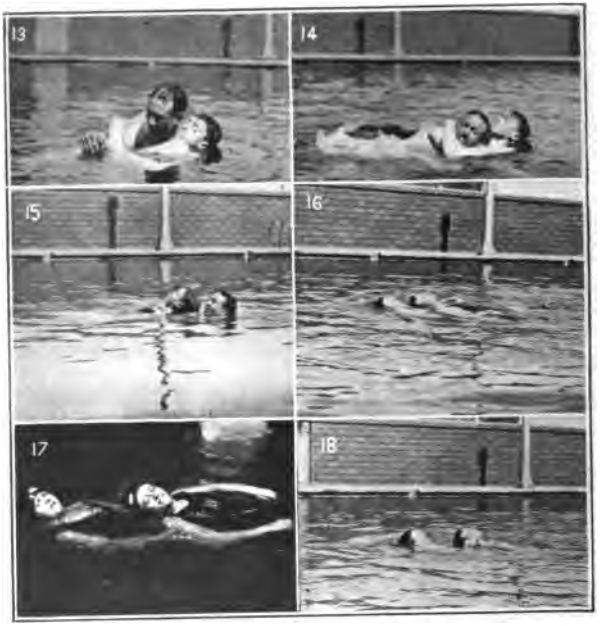

1 and 2. Breaking double arm lock by thumb and toe twisting. 3, 4, 5 and 6. Supporting subject.

in its socket, but again without jerking. The same break is also effective when the drowning person wraps arms and legs around you. It can be applied to either finger or toe (Fig. 14).

The foregoing releases will suffice for all practical purposes, but the prospective life saver will profit while practicing them by bearing in mind that the basic principles of water wrestling, as applied to rescue work, hinge on the following points: 1. The rescuer has far greater control over his physical and mental faculties, and can act and think more rapidly than the one in danger. 2. The arms are stronger near the shoulder and toward the wrists. 3. The legs are stronger than the arms. 4. An excessive backward bend of neck or spine make one helpless. 5. The pain caused by twisting any joint, even without injury, is sufficient to momentarily disable. 6. If the victim's head is held under water while the rescuer stays above surface the victim must soon become submissive. These are good things to remember always.

In learning to grasp and carry a person in the water a friend should again be used as a subject and asked to assume, in turn, the rôle of an unconscious, exhausted and struggling victim.

Although it is not difficult to support another while swimming, even under bad conditions, practice is needed to become adept, because both bodies have to be balanced carefully and the stroke must be correctly timed and performed, in order to avoid interference from the supported person.

Begin by having your subject swim off a few

yards and tread water. Then circle around him so as to approach from behind, pass an arm over his shoulder and across his chest, and plant your hand firmly under the armpit (Fig. 15). Now lift your knee to his lower back, give him a slight push upward and at the same time pull gently with the towing arm, thus bringing his body to horizontal position, face up, and immediately start swimming, using the free arm and the legs for propulsion.

Make sure while under way that the subject's mouth is above water; do not hold him too tightly; and guard against cutting off his wind by pressing with forearm on the larynx. Avoid also a jerky stroke, for it is likely to submerge the subject's face and cause him to draw in water if he breathes.

This carry may be recommended as the best under most circumstances, but an unconscious person or one that doesn't struggle may be towed a little more rapidly by merely seizing the clothes at the back of the neck, the hair, or by placing the hand under the chin.

If the one in danger is so violent that one has doubts about being able to retain control with one arm only, it is advisable to swim on the back and use the legs to propel, resorting to one of the following locks to insure safety: 1. Insert both arms under the subject's and clasp them on his chest (Fig. 16). 2. Take firm hold of both upper arms with your hands (Fig. 17). 3. Place one hand on either side of the face, at the jaw (Fig. 18). All three of these locks, taken from behind,

prevent the struggler's turning on you and keep him flat on his back, unable to give trouble.

The life saver should know how to undress systematically for a rescue, not to lose one precious moment, and this is the way to go about it: 1. Slip necktie and unbutton collar, vest and shirt with a quick double movement, throwing them off together. 2. Unbutton and slide trousers below knees, then squat down. 3. Pull off shoes and socks. 4. Rise and step out of trousers. By this method one may disrobe in less than thirty seconds, and clad only in underwear one swims unhampered.

The carrying of a heavy individual on land, at times necessary after a rescue, presents a serious problem to the inexperienced, but it can be done readily by means of the life saver's carry, which enables one to shoulder a good deal more than one's own weight without inconvenience. All should learn it, for it is of great value in case of accident, whether in the water or on terra firma.

Ask your subject to stretch out on the ground, face up, every muscle relaxed. Step at his right side, standing with shoulders to his feet, legs apart and well planted. Bend down; grasp his left wrist with your right hand; pass your left arm around his neck; lift him to sitting position. Then squat; slip your head under his left armpit; let your left arm slide down from his neck to his lower back. His left arm now rests on your neck and his left wrist is in your right hand. Pull his body toward you, raising it at the same time, so

that his weight will fall on your shoulder. Then pass his left arm through his own legs; seize his left wrist in your left hand; release your right hand; straighten up, back first, legs next. He will be slung on your shoulder (Fig. 19), firmly set and safe from fall, a comparatively light burden.

In the event of being called upon to carry a woman it is more practical to pass the left arm back of the thighs, just above knees (Fig. 20), instead of between the legs. The different conformation of body makes this carry equally secure.

In drowning cases the hardest part of the carry, the lift from ground to shoulder, can usually be eliminated by adjusting the subject to the wanted position while standing in chest deep water, either on bottom, steps, or any available footing (Figs. 21–22).

The carry is of especial value where the apparently drowned are concerned, because the victim's body is so disposed that mucus and water will flow freely from mouth and nostrils, while the intermittent pressure applied to the abdominal and pectoral regions as the walker jogs up and down at each step acts in the guise of artificial respiration. It is not unusual, indeed, for the victim to show signs of natural breathing in being thus carried. Even when assistance is at hand, therefore, it is well to use the carry. Volunteer helpers may be dispatched to prepare a clear spot for resuscitation, get blankets, seek medical aid, and keep back the curious.

We come now to the course to follow when con-

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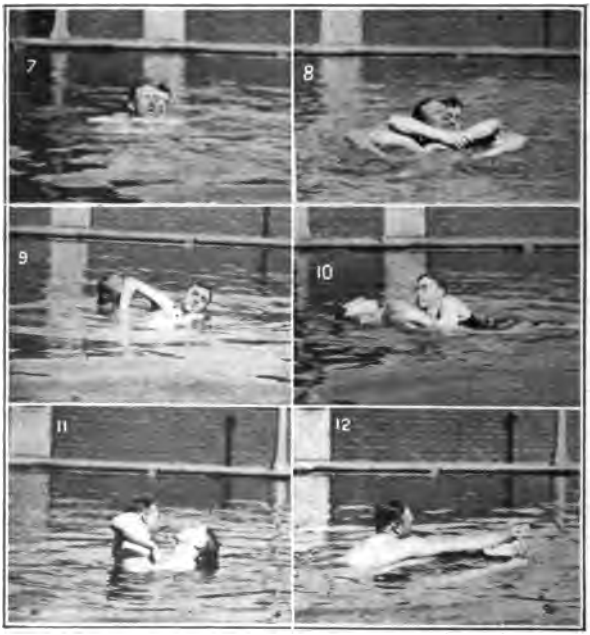

1, 2 and 3. Breaking back lock. 4, 5 and 6. Breaking a front body lock.

fronted with an actual case of drowning, and the first step is to strip for action without losing an instant, remembering to shout loudly, to attract attention and bring others to the rescue if several people are in danger, or difficulty is likely to be experienced.

Enter the water as soon as ready, making a very shallow dive if the depth is unknown to you, and strike out with slow, powerful strokes, saving your energy. Keep the victim constantly in sight and try to fully size up the situation on the way. Should tide or current be running don't breast it, cut diagonally, and if the drowning person is downstream seek a course which will keep you in the swiftest moving water. Of course, when any one in danger is some way off, and it is possible to get nearer along the shore, the fact should be considered before jumping in, for one can run a lot faster than swim.

In case the victim has sunk before you are able to reach him, mark the spot where you last saw him and look for bubbles on drawing near it. In still water they give the exact location of the body and you should dive a few feet from them, searching around in a narrowing spiral. In running water, the bubbles furnish an approximate direction to follow, but one must dive well above them, or of the place of disappearance, swimming under water with the current and looking right and left.

Upon discovery of a sunken body seize the hair, clothing at the back of the neck, or find some secure hold around head or shoulders. Then, if you are near the bottom and it is firm, push up

hard from it; if soft or muddy, however, don't chance becoming immeshed; start for the surface with a strong leg drive and rise with long, unhurried kicks and strokes of the free arm.

Either on coming up with a recovered body or after closing in with a person reached above water, take to whichever of the described carries circumstances make desirable and refrain from attempting to establish a record going in. Make your strokes full and vigorous, but not rapid. If the water is rough, a strong wind blowing, or noticeable current flowing, give thought at once to the selection of the most advantageous homeward course. The shortest route is not always the quickest in the water.

The minute you land seek a dry, clean spot, if available, then promptly start operating artificial respiration, should the subject be unconscious. Under no consideration allow such a patient to be shaken, massaged, slapped, or in any way roughly treated. Many people believe rough handling hastens recovery, but it is actually most dangerous, and it is safer to keep all onlookers at a distance, particularly as fresh air is essential for resuscitation.

After the subject has begun to breathe naturally, remove all wet clothing, rub his body thoroughly dry, then wrap him up in blankets or other warm covering and make him rest quietly in a well ventilated place.

Should he be suffering from chills or loss of vitality, massage gently the arms and legs, rubbing with easy strokes along the veins, toward the

heart, and apply circular friction to the palms of the hands and soles of the feet.

When facilities are at hand, place hot water bottles, or heated stones wrapped in cloth, at the patient's feet, armpits and abdomen; and administer every ten or fifteen minutes small doses of hot broth, hot milk, or stimulants. But do not allow the patient to leave until fully recovered, or he may suffer a dangerous relapse.

The most efficient of the methods of artificial respiration now in use is the Shafer, or prone pressure method. It has been conclusively demonstrated, both by scientific experiments and practical tests, that it affords better and more rapid results than any other.

Here is how to operate it:

Upon finding a suitable spot lay the unconscious person gently face down, head a trifle lower than feet, with mouth turned to any stirring breeze, arm bent under the head to support it. Then open and clean mouth, kneel across hips, place both hands on the small of his back, fingers spread and resting over the lower ribs of both sides. Now throw your weight gradually forward, applying increasing pressure for three or four seconds, thereby causing the vitiated air to be ejected from the lungs. Then straighten up quickly, releasing pressure, so that the abrupt springing out of the freed ribs will dilate the lungs and make them suck in a supply of oxygenated air. Wait a second, then press again for three or four seconds, and continue the process at the same intervals.

For a person of average size, the movements

should be made at the rate of about fifteen complete respiratory acts per minute. Smaller individuals require slightly more rapid work, and abnormally large ones slower, in proportion.

Watch the patient's face closely for signs of revival and lean forward frequently to listen, for you can then detect whether the air is being supplied in adequate quantity and also if mucus clogs the passage and needs removing.

Don't lose heart if the treatment fails to yield immediate results. Keep on with courage; persevere. Apparently drowned people occasionally only revive after long periods of faithful and incessant work, but authentic cases are on record of resuscitation following more than four hours of seemingly hopeless effort. Just remember that a human life is at stake and that you may be the means of saving it.

Before closing this chapter it is advisable to point out that the work of members of life saving organizations, or groups of either professional or amateur life guards, may be made more systematic and efficient by the use of prearranged signals, which will enable all those in the vicinity to cooperate intelligently. Particularly in Australia, the system of signals has been highly perfected and proved of immense value in emergencies.

A simple set of signals, which may be recommended, because some societies have already adopted it, and uniformity is desirable, is the following:

To give warning that some one is in danger of drowning sound a loud, prolonged "Yaw-hoo,"

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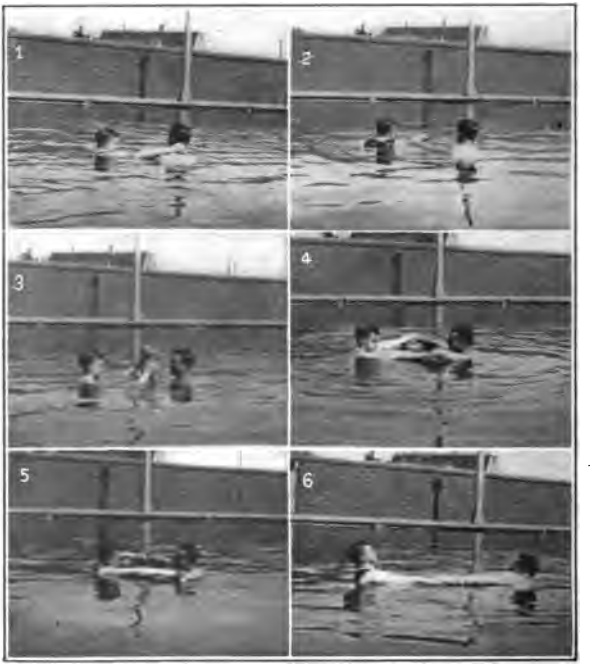

1, and 2. Evading a neck lock. 3, 4 and 5. Breaking a double wrist hold. 6. Release from an arm hold.

with falling cadence on the last note. This will attract attention even at a good distance.

When engaged in a rescue off shore and anxious to notify those on land that more than one person needs assistance, raise high above water first one arm, then the other.

If you have gone out with a life line and wish to signal "haul in," wave one arm sideways; for "more rapidly," repeat; for "pay out more line," move the arm backward, away from shore; for "stop hauling," make the motions toward shore; for "lost subject, pay out again," make the latter motions alternately with both arms.

At most beaches and watering places boats are used by life guards and they should always be ready for emergencies, with oars on board or within easy reach, anchor and cable made fast at the bow, preserver and life line attached to the stern.

When performing a rescue from a boat the following rules should be followed:

If the water is rough keep the bow toward the waves in approaching the drowning person and row up to windward.

If the subject is conscious throw him the life preserver or back the stern toward him and instruct him to seize the stern. Then, if he is light enough, draw him aboard over the stern, face toward you. Otherwise fasten the line securely under his arms and tow him.

In case you are alone and obliged to enter the water, either to pick up an unconscious person or recover the body of a sunken subject, never forget

to drop the anchor before diving, or the boat may float away and cause much delay and trouble. Also, if the anchor is heavy and the water deep, you can help yourself toward the bottom, when necessary, by climbing down the anchor line.

If several men are launching a boat to carry assistance the lightest should jump in first and take the oars, while the others get the craft under way and push it through the breakers, from the stern, if surf is running. As soon as the water is waist deep, the latter may jump in and one assumes the task of steering and keeping the victim, or victims, constantly in sight. He is also the one to go after the persons in danger when the time comes, and he stays in the water while they are being lifted aboard by the fellow guards, or by the man at the oars, if there are only two, he moving to the stern for the purpose.

Should there be room in the boat for the operation of artificial respiration, it should be started immediately, without waiting to reach land.

Life savers should school themselves to remain cool and calm under all circumstances; to think fast and say as little as possible. It makes for efficiency.

THE END

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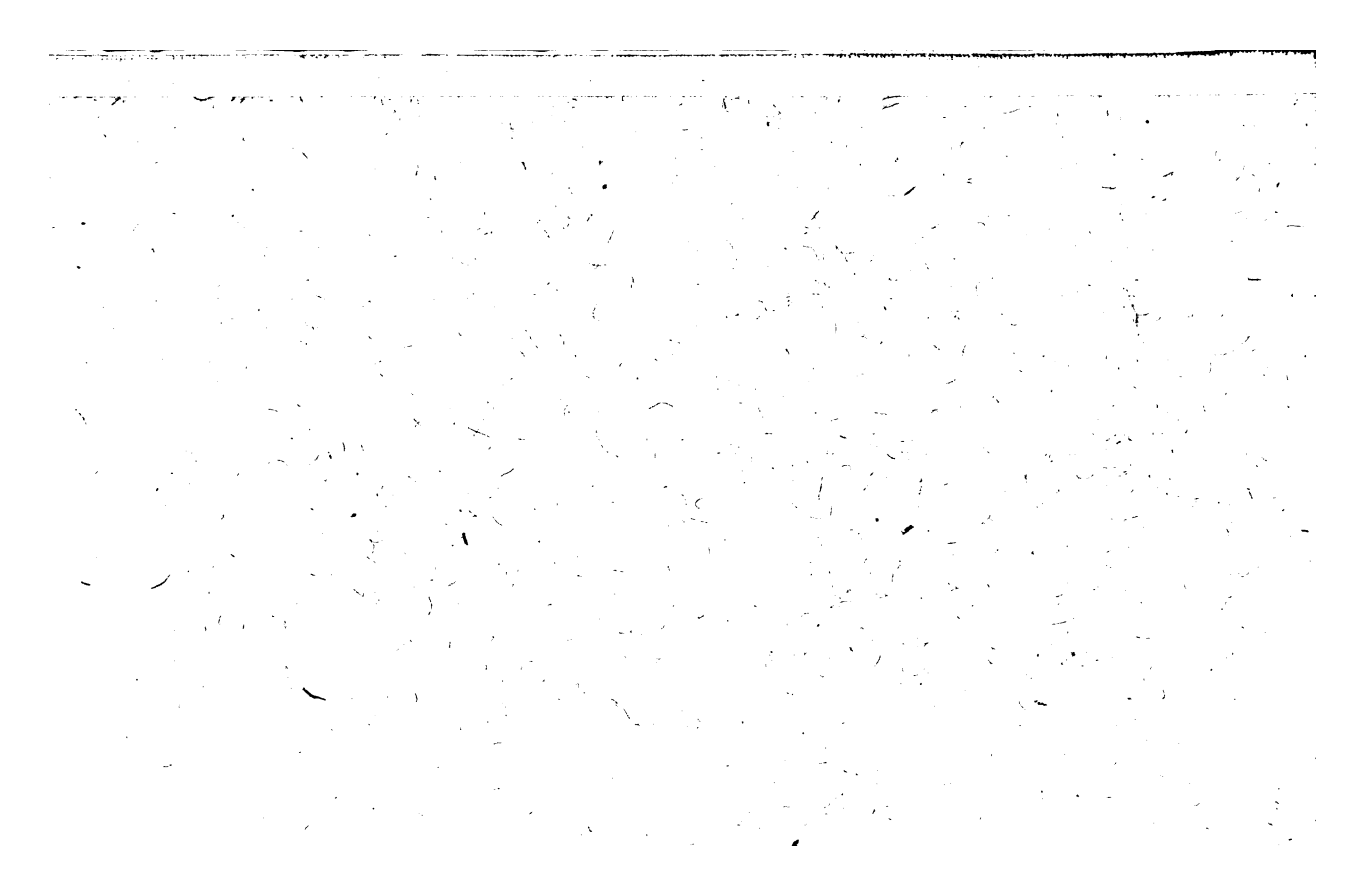

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